Invisibilising the Corporeal – exploring concepts of compositing and digital visual effects

Submitted by Paul Johnson to the University of Exeter as a thesis for the degree of Doctor of Philosophy by Research in English In October 2011

This thesis is available for Library use on the understanding that it is copyright material and that no quotation from the thesis may be published without proper acknowledgement.

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: 

.................................................................
Abstract.

This thesis seeks to explore the way in which invisibility as a concept becomes explicitly housed within digital compositing, visual effects (VFX) and certain attendant techniques. The chapters will establish how compositing and effects techniques can be seen as pushing modern filmmaking into concealing, and therefore visually releasing, certain physical structures within films’ images and their production. This shall be achieved by drawing upon a combination of texts that disseminate the technical nature and make-up of VFX, alongside discussion and theorisation of their use within cinema, together with other established film theory.

I will examine cases of VFX techniques within cinema that can be used to investigate how their construction and utilisation create invisibility to accommodate and nullify the profilmic elements captured through the camera and aspects of technology. The chapters begin by examining how the work of Georges Méliès, whose films use the concept of invisibility to promote a breakdown of temporal and spatial qualities, become redeployed in certain modern digital effects-based films. Expanding on this, the second chapter explores how theories surrounding realism as espoused through mise-en-scène and the so-called physical “truth” of the captured world can be rearticulated through VFX both optical and digital. Chapter three looks at how breaking down the physical structure of a performer through VFX and motion-capture result in characterisations that produce a sense of ghostliness, where the Bazinian mummification of photographic capture has new existence breathed into it. Finally, chapter four explores how recent developments in effects techniques in creating the Invisible Man act as a reflection of the physical body unbound in a digital world. Here, the digital infrastructure of modern culture, such as the Internet, is used to highlight how a more free-flowing and vivacious body can exist and make use of unseen and non-physical practices to commit nefarious acts, such as hacking. It is these aspects that become reflected in the most recent film iteration of the Invisible Man, *Hollow Man* (2000).
Acknowledgements

I would like to thank my partner Helen for being my inspiration and rock over the past few years during this adventure/journey. Without her I would not have succeeded in completing the following work. A shout must go out to Prince, the Kings of Leon, Fatboy Slim, The Killers, James Brown, Maxwell, D’Angelo, Erika Badhu, Otis Redding, Miles Davis, Satan Getz, The Beatles, MAW and the countless other musical artists whose music has made writing more pleasurable when it was hard. Mondo thanks to my supervisor Dan North, for his constructive criticism, help and patience, not to mention the book loans. Hello especially to Morwenna Hussey, and the entire post-grad administration department for their help in obtaining “stuff”. I’d very much like to thank the kindness of the archivists and staff at the University of London’s Harry Price Library of Magical Literature.

Last but not least praise and thanks to Auguste and Louis Lumiére, Georges Méliès, and the countless pioneers of cinema, special and visual effects: Ray Harryhausen, Willis O’Brien, John Dykstra, Denis Muren, Phil Tippett, Joe Johnston, George Lucas, Steven Spielberg, James Cameron, Sam Raimi, Robert Zemeckis, Cooper and Schoedsack, Pixar, Walt Disney and the (often) unsung animators at his company, and of course, H G Wells and the Invisible Man. Without you, your work and your escapades, none of this would have been possible.
Contents

List of Illustrations ................................................................. 5
Introduction ............................................................................. 9
Chapter One: Méliès, Black Art, Time and Space ...................... 38
Chapter Two: Reviewing Realism - the creation of mise-en-scène in the digital age ..... 91
Chapter Three: (Performance) Capturing Ghosts – the Ironic In/tangibility of Invisibility .......................................................... 154
Chapter Four: The Arrival of The (Digital) Invisible Man ...................... 209
Conclusion: “I See You” .............................................................. 274
Filmography ............................................................................. 285
Bibliography .............................................................................. 291
List of Illustrations and Images

Figure 1.1: Invisibilisation via the Williams Process in Whale’s *The Invisible Man* – 10.

Figure 1.2: original shot from *Deadwood* (2004 – 2006), showing modern traffic lighting – 14.

Figure 1.3: the completed shot, with the lights removed *and* a new patch of building, trees and other atmospheric debris inserted – 14.

Figure 2.1: Thayer’s “The Black Art Act”: showing the stage mechanics and layout of the process (from the Harry Price Collection) – 42.

Figure 2.2: Méliès and the four troublesome heads – 54.

Fig. 2.3: *The Most Dangerous Game*’s use of optical compositing, where live action film of the actors is combined with previously photographed footage of a waterfall – 63.

Figure 2.4: *Ghostbusters*’ Gozer temple matte shot, which incorporated separately photographed live action shots to create the final image. Note the blank space at the building’s corner for the live action Ghostbuster characters – 65.

Figure 2.5: Speeder Bike Chase from *Jedi*, combining individual elements from different temporal and spatial locations into a new area – 65.

Figure 2.6: Illustration of VistaVision format (by Max Smith), using 35mm film turned on its side, increasing the available frame space, and therefore grain – 67.

Figure 2.7: Note the transparency of Méliès’s detached heads (especially on the right side of the frame) in *Le Mélomane* – 68.

Figure 2.8: the soft focus style of *Sky Captain* reflects the cinematography of certain films made during the 1930s – 70.

Figure 2.9: The similar style seen in *Shanghai Express* (1932) – 71.

Figure 2.10: Polly “enters” Radio City Music Hall; created from a series of stitched together photos and composited into a blue screen shot – 72.

Figure 2.11: use of texture and lighting programs gives more believability to the alien Na’vi from Cameron’s *Avatar* (2009) – 74.

Figure 2.12: *Sky Captain* confronts the visage of Laurence Olivier’s Totenkopf, yet another distanced temporal element layered into the film’s final composition – 77.
Figure 2.13: Expanding the frame’s scope, and the original stage space in Snyder’s *300* (2006) – 88.

Figure 2.14: Evocation of space through two-dimensional stage flats in *Le voyage dans la Lune* (1902) – 89.

Figure 3.1: CGI Gollum composited into live-action footage in *The Lord of the Rings: The Two Towers* (2002) – 93.

Figure 3.2: From: *Citizen Kane* (1941) – 98.

Figure 3.3: From *Citizen Kane* (1941), showing the beginning of the apparently unbroken rise up through the theatre – 99.

Figure 3.4: From *Citizen Kane* (1941), the optical wipe’s join is hidden by the edge of the curtain -101.

Figure 3.5: From: *Star Wars Episode III: Revenge of the Sith* (2005), illustrating the masses of separate elements in the *mise-en-scène* that contend for attention - 104.

Figure 3.6: Final completed shot from *Spider-Man 3* (2007) – 113.

Figure 3.7: Studio set photography from *Spider-Man 3* (2007) – 113.

Figure 3.8: From *Black Narcissus* (1947), with the studio based live-action photography on the left and matte painting on the right - 115.

Figure 3.9: From *Star Wars Episode III: Revenge of the Sith* (2005), featuring the original Thailand plate, subsequent live-action elements from China, model trees, practical mist element, digital matte painting of the beach, and digital vehicles and structures - 116

Figure 3.10: The CGI version of the T-1000, from *Terminator 2: Judgment Day* (1991), exits a fire replete with its reflective elements and composited atmospheric details – 117.

Figure 3.11: the ice palace from *Dr. Zhivago* (1965), showing the physical dressing of the set in order to fabricate ice - 120.

Figure 3.12: Jango Fett and Obi-Wan, or their digital doubles, brawl in *Star Wars Episode II: Attack of the Clones* (2002) - 133.

Figure 3.13: the CGI Sandman (and surrounding CGI setting) from *Spider-Man 3* (2007) - 140.

Figure 3.14: live-action reference for the Princess in *Snow White and the Seven Dwarfs* (1937) - 144.

Figure 3.15: final animated frame from *Snow White and the Seven Dwarfs* (1937) - 144.
Figure 3.16: Thomas Haden Church and his digital addition - blending the indexically captured and artificially transfigured - 152.

Figure 4.1: the Slimer puppet and its operators from *Ghostbusters* (1984) - 155.

Figure 4.2: another rubberised “puppet” ghost from *Poltergeist* (1982) – 163.

Fig 4.3: a shot from *Ghostbusters*, showing the overlaid virtually immaterial animation of the ghosts entering New York City – 164.

Figure 4.4: the basic principle of matte shots (“Traveling matte shot” from intralinea.it) – 165.

Figure 4.5: An example of spirit photography (Frederick A. Hudson (England) – 169. (Mr. Raby with the Spirits "Countess," "James Lombard," "Tommy," and the Spirit of Mr. Wootton's Mother).

Figure 4.6: Final composited shot of the Seplavite attack from *Constantine* – 180.

Figure 4.7: the “traditional” or generic spectre; the translucent librarian ghost from *Ghostbusters* – 181.

Figure 4.8: A demon witnessed by the young Constantine, created by the imposition of digital layers onto a live actor – 182.

Figure 4.9: John Kricfalusi’s animation studies for creating squash n’ stretch heads – 189.

Figure 4.10: Animator Matthew Hackett poses in demonstration of how he characterised General Hein – 195.

Figure 4.11: General Hein stands appropriately posed in the final film – 195.

Figure 4.12: the translation of a mocap performer from fleshiness to its stripped-down computerised framework (Kirk et al “Skeletal Parameter Estimation from Optical Motion Capture Data” 782) – 196.

Figure 4.13: Hanks as the lifeless-eyed “Hero Boy” from *The Polar Express* – 196.

Figure 5.1: The anatomically correct, and raw, CG Invisible Man from Paul Verhoeven’s *Hollow Man* (2000) – 220.

Figure 5.2: Graphic scenes of violent spectacle concerning the body frequent much of Verhoeven’s work, as seen here in *Robocop* (1987) – 226.

Figure 5.3: Paul Verhoeven preps a green-suited Kevin Bacon on the set, whose torso will be removed and discarded through VFX to create the illusion of invisibility – 231.
Figure 5.4: James Whale’s 1931 visualisation of the Invisible Man, starring a bandaged and smoking jacketed Claude Rains is acutely repackaged and homaged in … - 232.

Figure 5.5: John Carpenter’s *Memoirs of an Invisible Man*, starring Chevy Chase – 233.

Figure 5.6: A carefully constructed set looking up into the partially invisibilised Magnoscopics building, using hidden supporting structures and sightlines to create the illusion of partial invisibility – 235.

Figure 5.7: a wide shot of the same “in-flux” building using the more traditional analogue VFX of a scale model composited into the shot – 235.

Figure 5.8: Alice (Daryl Hannah) paints a face onto the invisible Nick (Chevy Chase) – 238.

Figure 5.9: Image of ENIAC (U.S. Army Photo), the first purpose built electronic computer, which bares a striking resemblance to … - 244.

Figure 5.10: this close-up of Professor Gibbs’s invisibility machine from *The Invisible Woman* – 244.

Figure 5.11: from the left - the smaller, but more powerful integrated circuit microchip alongside the larger, less sophisticated and weaker transistor, and earlier vacuum tube – 245.

Fig. 6.1: W. K. L. Dickson and Thomas Edison’s cabinet-sized Kinetoscope (c. 1894) – 274.

Fig. 6.2: Scarlett O’Hara travels through a morass of the wounded and dead of Atlanta in an optically composited shot from *Gone With the Wind* (1939) – 277.

Figure 6.3: The character Benjamin Button is an ontologically uncertain representation of the cinematic reality, a mixture of the prosthetics, digital and profilmic, composited together - 279.

Fig. 6.4: Jake rushes over and through the undergrowth – the finished scene replaced the basic construction of the filmed chase with the more elaborate and realistic Pandorian jungle, invisibilising the set, the stuntmen performing it and various others layers – 281.
**Introduction**

She could hear the murmur of voices for the next ten minutes, then a cry of surprise, a stirring of feet, a chair flung aside, a bark of laughter, quick steps to the door, and Cuss appeared, his face white, his eyes staring over his shoulder. He left the door open behind him, and without looking at her strode across the hall and went down the steps, and she heard his feet hurrying along the road. He carried his hat in his hand. She stood behind the door, looking at the open door of the parlour. Then she heard the stranger laughing quietly, and then his footsteps came across the room. She could not see his face where she stood. The parlour door slammed, and the place was silent again. (H.G. Wells *The Invisible Man* 24)

To become invisible is to be something that cannot be seen, a liberated body that is able theoretically to move at will, to evade pursuers, to eavesdrop, spy and to commit acts that a visible person could not so easily accomplish. As the above quotation highlights, Wells’s Invisible Man moves unseen, his physical body erased from sight, surprising and startling the nervous Mrs. Hall. Merriam-Webster defines the word “invisible” as meaning “a: incapable by nature of being seen [and] b: inaccessible to view: HIDDEN” (“Invisible”). In addition the word can also mean to be marginalised or culturally ignored, as explored by Ralph Ellison in his novel *Invisible Man* (1952) concerning an African American character in mid twentieth-century America; the novel follows Ellison’s unnamed protagonist as he struggles to be noticed beyond his position as a stereotype – just another black man on the streets – despite his capabilities.

Invisibility as a narratival trope is malleable and rich with potential, employed in ways that stretch beyond a single trait, character or object. Aside from Wells’s *The Invisible Man* (1897), there is H F Saint’s *Memoirs of an Invisible Man* (1987), which follows the predicament of a securities analyst who unwittingly becomes invisible. It is an important element in Walter B. Gibson’s *The Shadow* (1930 – present), whose title character evades capture through “the power to cloud men's minds so they cannot see him” (from the radio broadcast “The Death House Rescue”). J.R.R. Tolkein’s *The Hobbit* (1937) and *The Lord of the Rings* (1954 - 55), feature a ring that bestows invisibility on
all who wear it. Furthermore, the cloak of invisibility worn by Harry Potter (from J. K. Rowling’s novels 1997 - 2007) and Perseus’s cap of invisibility, demonstrate that the idea has been widely used across multiple centuries, media and genres. In science fiction television and films, the concept is used to provide spacecraft with so-called cloaking devices, such as Klingon Birds of Prey in the *Star Trek* series (Marc Daniels et al. 1966 -2005) and subsequent films (Robert Wise et al. 1978 on). Furthermore the alien Predators from John McTiernan’s *Predator* (1987), its sequel and offshoots depict devices that bend and refract light in order to hide their users in battle.

*Predator* and *Star Trek*, as well as the cinematic versions of *The Invisible Man*, from James Whale’s 1933 version onwards (see Fig. 1.1) and more, visualise invisibility (as paradoxical as that may seem) through special and VFX techniques, and it is those techniques that comprise the primary focus of this study. The following chapters seek to study aspects of how VFX are used to create and use invisibility in a range of films. I will show how invisibility is in fact a continual part of effects creation, and how it impacts upon aspects of the physical structures of filmmaking. Indeed, the entire thesis is built around demonstrating the trope of invisibility as a flexible and very rich conceptual basis for espouse such values, beyond the more obvious and literal instances of making something invisible. By virtue of this, the working methodology will undertake an exploration that crosses numerous films in order to demonstrate that the concepts circulate throughout innumerable films within cinematic history. As Siegfried Kracauer states: “Film […] is uniquely equipped to record and reveal physical reality and, hence, gravitates towards it” (“Basic Concepts” 10). When physicality is mentioned within the following pages it refers to various specific aspects of filmmaking and cinema. This notion of physicality includes both the fabric of cinema itself (celluloid film), the technological structures that
are used to create cinematic productions and their VFX (sets, locations, actors, models etc.), and the changes in filmmaking techniques (such as editing, and the creation of effects). As the quote indicates, Kracauer argues that film gravitates towards, revealing and recording reality automatically. But, amongst other issues, it is the task of this thesis to explore and interrogate these capacities, seeking out answers as to whether reality is a concept of fixed or perhaps variable qualities.

Kracauer notes that a film that uses techniques such as editing, speed and reverse motion and special effects – but imperfectly records physical reality, is more interesting and important than films that “brilliantly” utilise all the techniques, but disregard camera-reality (“Basic Concepts” 11). Arguably then, it is likely that Kracauer would perhaps rather see films that were less filled with the techniques of special and VFX, such as those that will be discussed here.

Christian Metz in his article “Trucage and the Film” (1977) discusses aspects of optical techniques, offering further pointed evidence regarding their ability to divide film’s constitution. With recourse to breaking apart the profilmic basis of photographic imagery¹, Metz notes of optical wipes, fade-outs and so forth, that the original photographic image is itself the referent, stating, “opticals have [...] the images themselves [...] as referents”, whereas the original image uses an object as its referential point of contact for the audience (657). This then breaks away from the index of the object as captured by the camera, to one recaptured later on. In line with Kracauer’s observations on recording physical reality, Metz’s work highlights how the trucage (especially optical ones) begin to participate in a playful dynamic with film’s recording abilities.

Crucial to Metz’s work here is his notation concerning the punctuations of films through the trucage, and the different types of trucage that are in play. Most aptly for my own work is his suggestion of invisible trucages against the visible and imperceptible. Whereas the use of a stuntman is designed as imperceptible (“in complete compatibility [...] with the realistic film”), the use of invisible trucage is conversely perceptible

¹ Though the term trucage translates as special effects, Metz is at pains to denote he does not mean special effects in the broader sense, such as the creation of pyrotechnics or the use of models et al. But, his discussion does touch upon the use of essential practices that enable the placement of all effects within films. Trucage can also refer to rigging or
because, Metz says, we sense it (664). Metz continues this point by denoting how invisible *trucage* are put to great use in Invisible Man films, stating, “These are very convincing *trucages*, impossible to localize, but the existence of which is beyond doubt and even creates one of the major interests of the film” (Ibid.). Metz later notes:

*Trucage* then exists only when there is *deceit*. We may agree to use the term when the spectator *ascribes to the diegesis the totality of the visual elements furnished him*. In films of the fantastic, the impression of unreality is convincing only if the public has the feeling of partaking, not of some plausible illustration of a process obeying a nonhuman logic, but of a series of disquieting or ‘impossible events’ which nonetheless unfold before him in the guise of eventlike appearances. In the opposite case, the spectator undertakes a type of spontaneous sorting out of the visible material of which the filmic text is composed and ascribes only a portion of it to the diegesis. (667)

What therefore becomes apparent is that the type and position of trucages are different, flexible, often implicit technical feats that manage to change the constitution of the film. They create moments that explicitly change the film’s overall structure as a means of denoting information, are not always perceptible, but almost always sensed by the audience. Whilst Metz suggests we may not necessarily visually perceive the *trucage*, I would go so far as to state that the terminology of the *trucage* could be expanded to incorporate the entirety of special effects and indeed compositing. Because, as Metz notes above in relation to *deceit*, more often than not though we don’t always literally see the VFX at work, we become aware that it is present and often willingly partake in its operation, both narratively and as an extradiegetic point of interest.

Because, invisibility plays a far greater and more widely developed role in cinema than might notionally be expected from the films mentioned. By adjusting or augmenting the *mise-en-scène* through processes such as mattes, models and compositing, such techniques amount to a form of invisibilisation that benefits the film’s final visual make-up. In other words, the construction of VFX shots relies as much on concealing, removing, and therefore making invisible, certain elements from the scene as it does
building and inserting them. This produces a contradictory, but nonetheless necessary, idea of absence and presence. Susan Hayward ascribes numerous possibilities to this term, stating, “Cinema makes absence presence; what is absent is made present. Thus cinema is about illusion […] Cinema constructs a ‘reality’ out of selected images and sounds” (1 - 3). Hayward therefore acknowledges absence/presence’s capacity to position the spectator within the film’s world when he/she is not physically present, constructing an on-going diegetic world from elements shots atemporally, and presenting images of stars and other icons which are not actually present due to time, distance and so on. By exploring and expanding on such principles it is possible to see how cinema’s use of effects reflects the development of absence/presence. For example, by introducing a new element – be it a physical or CG model, backdrop, atmospheric effect etc. into the composition, and by their introduction subsequently removing what was originally there – an original background, blank stage, or some other piece of original piece of mise-en-scène – the idea of absence/presence is similarly produced. This use of digital imaging technology impacts upon the indexicality of the photographic image, playing with the apparently reliable trace of a physical structure’s presence. Indeed, one of the supporting questions that propel my discussion is whether physicality has been replaced by the immaterial and non-physical dimensions of digital constructs within aspects of mise-en-scène (its characters, settings, the creation of space and time).

Most pertinently, this study examines the role of compositors and compositing, which combines the various different layers of effects into a film’s frames in order to create a complete and apparently seamless whole. Compositing and VFX are used to show us something, be it the spectacle of an explosion or a vehicular action sequence, but they can also be used for something as apparently innocuous as the removal of unwanted signage or part of a background. For example, the period Western series Deadwood (Ed Bianchi et al 2004 – 2006), required considerable amounts of contemporary Los Angeles to be removed from backgrounds and foregrounds to enable the late 1800s South Dakota setting to be realised. As the title to senior compositor Steve Wright’s article “The Importance of Invisible Effects”, suggests, the work of a compositor not only combines obvious effects into a film’s composition, but also removes other unwanted and extraneous objects. The traffic lights seen in the original shot are removed and a new
A patch of background is produced that matches the surrounding buildings (Figures 1.2 and 1.3).

Wright notes that the extraneous lights had to “go without a trace” and painted the new part of the frame by using a programme that layered in colour, shadow and detail that were copied from the surrounding pieces of building (19). So in this shot – and many others – effects techniques are used to both make invisible the lights and also to show us the finalised diegetic space of the setting. VFX and compositing therefore make invisible the sign and yet reveal something new, creating presence/absence and vice versa; removing the concrete, physical element of the traffic light to replace it with a non-physical digital one.

Wright opens his article by describing these types of effects, including the removal of wires, lights, signs and other objects from the frame, as “invisible effects”, unseen and unnoticed (18, emphasis in original text). But they also constitute a form of invisibility because, as a compositor, he conceals – and therefore makes invisible - portions of what are known as the profilmic event that might form the basis of the composition that was visible. Ironically, a compositor also makes the invisible visible, since he presents new pieces (such as the portions of a building) for the audience to see, which in turn have concealed and invisibilised the previous (profilmic) element. So, when audiences watch a film that contains numerous VFX elements they are always to some extent witnessing a form of “absence presence” through invisibilisation. Furthermore, it is not merely the removal of unwanted signs, but also the inclusion of many other elements that, through the same process of concealment and invisibilisation of a frame’s sections, simultaneously make the invisible visible, and the visible invisible.
Paradoxically, despite the compositors toiling to create the totality of a frame, portions of that frame have been covered up or otherwise discarded. Compositing and the insertion of VFX lead to a dissection of the frame and the overall make-up of the film. This cutting up of the film’s visual fabric can consequently be viewed, I will argue, as a fracturing of cinematic physicality, of the physical elements captured by the camera. Previously films have made use of many profilmic aspects – actors, costumes, sets and locations and assorted other mise-en-scène – which occupy a physical space in front of the camera and are then transcribed onto film. Even within VFX shots, physical models, paintings and explosions – those corporeal, substantial and tangible elements that are photographed – may have been used, but with the onset of digital VFX, certain practices have enabled the creation of insubstantial, non-corporeal elements that replace the previously tangible. A painting can now be “painted” on one computer workstation, and a model exists as a three-dimensional object within another, all within virtual space.

Furthermore, an actor’s performance can become physically distanced from its original host through motion capture (or “mocap”), where the performer’s action is recorded and relayed onto a digital frame that can be manipulated in virtual space, but it has no tangible substance outside of it. The following chapters therefore also seek to probe the role of invisibility in effecting such fragmentation. It is not a new phenomenon, but a technique generated over centuries, with digital technology merely the latest iteration. In charting the ways in which VFX have developed their capacities from pre-cinematic illusions, through optical and digital adaptations, this study also explores how digital technology works with, and connects to, the analogue and indexical basis of cinema.

Lev Manovich has written that cinema has traditionally been developed around arranging the physical reality of sets and performers, but that the move to digital techniques and technology has seen a sea change in filmmakers’ creative aesthetics. He tells us that, “occasional manipulation of recorded film (for instance, through optical printing) was negligible compared to the extensive manipulation of reality in front of a camera” (“What is Digital Cinema?”). In the more recent digital age the physical constituents of film and filmmaking become transformed, with photographic footage no longer being the fundamental essence of many films’ final make-up. Instead, Manovich continues, “shot footage is no longer the final point but just raw material to be
manipulated in a computer where the real construction of a scene will take place” (Ibid.). The profilmic event, for Manovich and many other commentators, is only the beginning of a much longer imaging process, and this study aims to examine how CGI and aspects of digital techniques within VFX take the ideas and concepts of invisibility and use them to change, integrate and remove physicality from the film frame.

As each chapter progresses, the question as to how invisibility is achieved, how it impacts upon the area in which it is located and what it might ultimately suggest and mean shall be addressed. A continuing theme that binds the chapters together is how the physicality of the films’ worlds is made invisible and in more recent productions substituted by digital constructs, and how this reflects considerations of theories of film form. Considerations surrounding the use of invisibility shall involve theories examining time and space in relation to editing, cinematic realism and *mise-en-scène*, the use of mocap and its impact upon performance, and “new” digital media’s impact upon creating digital elements in relation to digital spaces, such as the Internet and the position of the physical body therein. Physical aspects of filmmaking, and theories surrounding the physical cinematic form and their replacement, shall be interrogated. The question is: does invisibility as “seen” within these films, through techniques that invisibilise objects, people and other elements actually manage to undermine film’s status as a record of physical profilmic events, objects and people?

The relationship between film and reality has been a constant area of discussion and debate since the very earliest days of cinema. Critics have often posited an opposition between the work of the Lumière brothers and that of Georges Méliès (Kracauer “Basic Concepts”), where the films of the former are seen as actualities, objectively recording everyday activities and scenes from bourgeois life, and those of the latter comprising a series of fantastic spectacles and tricks. As Tom Gunning points out, actualities played a significant part in establishing cinema during its early development, outnumbering fictional, staged subjects until approximately 1906 (“ Attractions” 56). Méliès developed films that revolved around tricks and narratives of a different order, using stop-motion substitutions and multiple superimpositions of different actions onto the same piece of film in order to effect disappearances, transformations and other highly spectacular visions. Authors such as Dai Vaughan note that most of the people involved in the
Lumière films are engaged in performing for the camera in some way. Though the style of performance employed differs to that seen in trick films, comedy and expressions of movement (such as dance), the development of a narrative is still seen in each filmic type (65). In each, narratives are still constructed through a single shot without superimposition or photographic tricks, relying upon more natural performances, settings and staging.

Questions of “pure” photographic record and representation are central to André Bazin’s “Ontology of the Photographic Image” (1960), which postulates theories on the creation of realistic cinematic style. A fundamental concern of Bazin’s theorisation is developed around mise-en-scène, or ”staging of action”, a term concerning how elements such as costume, lighting, setting and performance are used to build cinema’s visual and aural composition (Bordwell and Thompson 145). For Bazin, the use of such elements within a scene, without further enhancements such as editing, special effects or further distressing of the profilmic event before the camera, could produce a more realistic evocation of narrative and character, a more objective aesthetic (“Virtues and Limitations” 41 - 52). In place of egregiously editing scenes, which broke apart the physical integrity of the profilmic event to construct and pre-determine the spectator’s engagement with the scene, Bazin advocated uninterrupted, flowing employment of staging in depth, long takes and naturalistic use of performance and setting for granting the spectator less heavily mediated access to the truth of the scene.

Moreover, Bazin appreciated the indexical nature of the photographic image; due to the automatic nature of their registration, photographic media conferred on the depiction of their referents a level of objectivity beyond that which could be achieved by painting, whose images always reflected the singular subjectivity of the artist. Bazin noted that:

[A]ll are agreed that the image helps us to remember the subject and to preserve him from a second spiritual death. Today the making of images no longer shares an anthropocentric, utilitarian purpose. It is no longer a question of survival after death, but of a larger concept, the creation of an ideal world in the likeness of the real, with its own temporal destiny. (“Ontology” 6)
The notion of a spiritual death is an interesting analogy, one that points towards the capacity of cinema to hold and preserve the physical presence of the human and other forms. Though Bazin sees the recorded image producing an ideal world, with the “real” at the forefront, there are greater aspects to be drawn and understood from his article. One such matter is the dichotomy between the physical and non-physical presence of the recorded elements. Moreover, the idea of preservation from a second “spiritual death” is even more prescient to aspects of the thesis’ later chapters. The examination of mocap, a process that makes a performer invisible by their removal from the frame and their replacement with data and an ultimately digital construct, points towards a presentation and reorganisation of physical properties. Moreover, Bazin’s ideas surrounding the spiritual death and mummification of an object can be extended to that of digitising a person and how they are perceived within and beyond perceptions of the Bazinian notion of the “real”, and their existence within the cinematic world.

Bazin continues that the photographic image and, by extension, film images, have the capacity to bear the emphasis of realism by virtue of mechanical reproduction (Ibid.). In using the mechanics of the camera, the objective representation of the referent, presented by the camera exactly as it appeared before the lens, could be most successfully captured and preserved. Bazin informs us:

The objective nature of photography confers on it a quality of credibility absent from all other picture-making. In spite of any objections our critical spirit may offer, we are forced to accept as real the existence of the object reproduced, actually re-presented, set before us, that is to say, in time and space. (Ibid. 7 – 8)

Accordingly, the development of realistic statements in cinema, of the creation of a world, characters and truthfulness therein, issues from the physicality indelibly documented by the photographic image. The photographic image acts as guarantor that the subject had once been physically present before the camera. But it is a practice that can be critiqued. The impact of digital techniques enables filmmakers to replace and augment much of the captured profilmic space with a range of other physical and more
especially digital elements. The diegetic *mise-en-scène* of the film becomes the site of debate surrounding the creation of realism and the ontology of images.

Physical reality is partially sacrificed in sequences using optical elements, but they do not involve what I will be describing as invisibilisation nearly as proficiently as in adaptations of Wells’s novel; nor do they invisibilise and replace portions of the settings to quite the same extent as other more recent films. Previously, invisibilisation was often left to productions using front/rear-screen projection or matte screen techniques, to produce dialogue scenes in moving vehicles, or where scenes set in hazardous locations or other worlds necessitated the fabrication of backdrops that were inserted into the film’s visual structure. Rear projection techniques\(^2\) were used relatively early in film, ranging from the 1920s onwards (see Rickitt 82 – 89), while other versions of these matte systems can be seen in films such as Merian C. Cooper and Ernest B. Schoedsack’s *King Kong* (1933), which incorporated miniature rear projection into scenes (see Rickitt 184 – 187). Achieved either through plate photography captured by a second unit, stock footage or matte paintings on glass, such effects were the choice of teams using in-camera techniques or optical printers, stretching back to the late nineteenth century and the work of Georges Méliès. *Young Sherlock Holmes* (Barry Levinson, 1985) begins to show a change in the use of digital effects, since it places a digital character within a real-world setting that also contains a human performer. The scene features a Knight made of glass that comes to life and jumps from the stained-glass church window that had held him. The Knight then stalks a cleric, who is actually hallucinating the attack, who cowers backwards before rushing into the street. Certain shots featured not just the Knight itself, but also the cleric and the digital character in the same shot in a realistic church setting. Over the next decade such work began to accumulate more screen time – with certain instances of the T-1000 in James Cameron’s *Terminator 2: Judgment Day* (1991) and dinosaurs in Steven Spielberg’s *Jurassic Park* (1993) inserting CGI elements into live-action footage of a notionally real world that also

---

\(^2\) Rear projection is described by Ira Konigsberg as:

The projection of either a still or moving picture onto the rear of a translucent screen in front of which live action is photographed so that the background on the screen and the foreground action are combined into a single image on the exposed film. (324)
featured human actors. Though fantastic and spectacular examples, such work highlights the on-going proliferation of computer-generated, non-physical constructs (i.e. those lacking an indexically registered referent on film) in areas of cinema that had often relied on models, paintings and other physically based, “practical” effects. Previous films of this nature, such as *King Kong* (and *Jason and the Argonauts* (Don Chaffey, 1963) used articulated miniature models made of cloth, animal fur and steel armatures and were painstakingly animated by hand, frame by frame. The newer elements in *Terminator 2*, to cite one example, were in part produced within computer mainframes out of data that ultimately exists only as ones and zeroes and cannot be touched nor exist in the same way that sets, costumes, models and other profilmic elements had previously been tangible.

In the late 1990s, the interpolation of CG effects within films began to take an even greater hold, a characteristic perhaps signposted by the development of fully CG animated films. These included John Lasseter’s *Toy Story* (1995) and Eric Darnell and Tim Johnson’s *Antz* (1998), which began a shift from the photography of models and hand crafted objects and artwork, to the use of CG models and characters. Although the digital animation featured no physical objects for its on-screen visual realisation, designs for the characters of *Toy Story* and vehicles, characters and sets for films such as George Lucas’s *Star Wars Episode I: The Phantom Menace* (1999) were, and still are, customarily created via hand-drawn designs and maquettes that are subsequently digitised. As Shilo McClean notes, *Titanic* (James Cameron, 1997) only featured one shot that was created solely in CGI, an underwater shot of the ship, with other VFX shots using a combination of various mechanical, practical and digital techniques (58). Though accomplished in part through digital means, the use of mocap in creating the ship’s passengers on deck and elements involving the Titanic upending and sinking into the ocean necessitated the use of actors performing for mocap cameras and a scaled hydraulic bow set of the ship shot against green screens. Though the captured data was translated into digital characters and the set fused with other digitally created elements of the sea and sky, the film relied on a marriage of digital and physical elements.

Physical reference is still an important component of the image in “digital cinema” (whether that means films made using digital cameras, or films making extensive use of digital effects), but digitally-created elements are equally at hand and
beginning to be more fully instilled into cinema’s physical constituents. Industrial Light and Magic (ILM) and other effects houses (such as Digital Domain) are now fully digital VFX enterprises. ILM’s optical department still essentially exists, bought out by previous ILM personnel and renamed as Kerner Optical, and continues to produce numerous practical, miniature and matte shots (McGorry, “Kerner Optical”). These include models for Steven Spielberg’s Indiana Jones and the Kingdom of the Crystal Skull (2008) and Gore Verbinski’s Pirates of the Caribbean: Dead Man’s Chest (2006). Yet the use of mocap within both animated and live-action filmmaking has proved popular due to creative and budgetary opportunities. From Gollum in Peter Jackson’s adaptation of the Lord of the Rings trilogy (2001 – 2003), through its use to create King Kong in the 2005 feature film of the same name, and human characters within Robert Zemeckis’s The Polar Express (2004), Beowulf (2007) and Gil Kenan’s Monster House (2006), the digitisation of human performance alongside digital animation techniques has proved to be a fruitful tool.

Describing the creation of the Gollum character within the Lord of the Rings: The Two Towers (2002), Joe Fordham relates that the effects artists deemed the use of puppetry too restrictive in bringing the character to life (“Middle-Earth Strikes Back” 74). Furthermore, the use of make-up in combination with CGI embellishments to the actor’s eyes and limbs was also rejected with Jackson feeling the design would prove disappointing (Fordham Ibid.). Jackson went on to state that the character of Gollum was “[S]o emaciated and twisted […] walking on all fours, scrambling up and down cliff faces – it just wasn’t conceivable that we could have done that with a human” (Jackson qtd. in Fordham Ibid.). As a result the filmmakers produced the character as a digital manifestation, but used actor Andy Serkis as both an on-set reference for interaction with the other actors and the animators, and to create mocap data that drove the digital puppet’s frame. In order to get from the raw footage featuring Serkis to the final version of Gollum, the effects artists would remove Serkis from the film’s frames by carefully

---

marking out and digitally removing the area his physical body took up and then inserting the digitally produced Gollum character into its place. (51)

Thus, digital VFX are used partly to remove and replace the physical performance of the actor, making the form invisible. Moreover it is a feature that is continued within many other VFX areas, from compositing backgrounds and creating an amalgamation of insubstantial digital elements that lock onto and often replace the human, physical and solid aspects of a film’s constitution. Digital effects have, in the words of Michael Allen, “now become the focal point around which the promotion of a major new release might be organised. Indeed, it could be said that the dominant identity of mainstream big-budget filmmaking of the past decade is one framed by such images and such image-making technologies” (824). As Dan North has pointed out:

The computer generated object is a creation whose physical presence bears no resemblance to what it signifies – it is merely a quantity of data in a microchip – but when transferred to its imagistic form, it can be rendered with such photographic verisimilitude that it can appear to be an index of its referent. (9)

These authors note the importance of digital images within mainstream cinema and that they do not require a physical referent, since they can construct the appearance of one. Key to such developments is digital compositing, where an operator can combine a myriad of different elements, from photographic and digital sources, into a film frame erasing the void of a blank blue screen and seamlessly inputting a background in its place. These techniques allow elements to not merely be placed into the frame, as with previous optical techniques, “but blended, [with] their boundaries erased rather than foregrounded” (Manovich “Language” 155).

Moreover the use of digital techniques to remove wires from stunt and fight sequences, as well as the elimination of unwanted factors from within a film’s mise-en-scène, such as graffiti (as in Le fabuleux destin d'Amélie Poulain/Amélie (Jean-Pierre Jeunet 2001)), modern antenna and architecture from what should be an antecedent period setting (as in the making of Deadwood), requires using further invisibilisation. By digitally painting out harnesses and wires that hold and suspend performers, compositors
can make the scene seem more realistic, or at least more narratively comprehensible and sustainable, dramatic and/or believable within the context of the scene. For example, fight scenes within Ang Lee’s *Wo hu cang long/Crouching Tiger Hidden Dragon* (2000) which required gravity-defying leaps over buildings used wires to support and move the actors, which were then digitally erased. Shilo McClean sees the use of “invisible” effects – whose usage is “neither open nor apparent” - as part of a range of techniques that drive storytelling within films (76). She continues: “The basic quality of an invisible effect is that it should be completely undetectable. There should be no reason for the audience to suspect that effects have been used at all. Everything about the shot must be physically possible” (78). Thus, she notes that digitally added rain should mimic the expected physical properties of rain and further illustrates her point with stills to show the insertion of a digital arrow into the film *Shi mian mai fu/House of Flying Daggers* (2004) (McClean 78 – 79). The arrow against the bowstring and hands of Tony Leung in *Shi mian mai fu* had to be invisibly composited into the background plate, so that the overall shot attains a sense of uniformity. In addition using a CGI arrow also enabled a greater level of simplicity and safety for the actors, who may not have archery skills and might be injured by real arrows.

McClean also points towards “seamless” effects - visual elements that are allied, but somewhat different to invisible effects. She describes the seamless effect as detectable “given reasonable consideration” (78). Consequently, though they should pass unnoticed, they are ultimately perceptible as effects, but still fit flawlessly within the film’s visual framework. In McClean’s eyes digital effects of the invisible type would be those that remove unwanted logos and replace them for copyright reasons (as denoted by Brinkmann 457). This often requires both a large amount of hand painting of individual frames as well as tracking and compositing of the relevant new element over the old, but the alteration is designed to pass unnoticed in the final shot. The creation of the final frame can therefore contain elements that are not notionally perceptible, but conversely are detectable due to their impossibility. So, whereas the example of the arrow’s creation is deemed undetectable (produced for safety reasons and ease) and never meant to be noticed, the insertion of other elements, such as certain types of buildings, objects, characters, and especially futuristic craft and their movement, are ultimately detectable.
McClean uses Roman Polanski’s *The Pianist* (2002) as an example, asserting that the realisation of a war-torn 1945 Warsaw was not “an accessible environment” and therefore required the use of a matte painting placed into the live-action location footage to produce the desired narrative effect (78 – 9). But the production of a car chase might just as easily be deemed to use seamless effects, such as the freeway chase in Andy and Larry Wachowski’s *The Matrix: Reloaded* (2003). Because – aside from the gravity-defying movement of various characters - the chase appears to be set in an environment that has physical characteristics commensurate with the real world. Indeed the scene involved numerous real cars and vehicles and took place on a custom-built road, but a considerable number of digital effects were also applied. A climactic shot featuring characters thrown from one of two crashing trucks involved many digital elements that were produced from references of real performers, trucks, explosions and the freeway set. Though the shot, with its buckling metal, flames and flying people was quite extraordinary and arguably unrealistic, it nonetheless had to seamlessly fit into a scene that used pieces of camera-reality⁴. The nature of such effects, at least on a technical level, can be seamlessly fused with the other elements. But no doubt the location and other elements must also be dressed to aid integration, and the matte painting (digital or otherwise) or other elements inserted into and over portions of the original background plate makes that space invisible by concealing its presence. Moreover, though McClean notes that a scene using invisible effects may require a level of invisibility, it is perceptible in some fashion to varying degrees. The effects as discussed within the following pages are often simultaneously touching upon many of the paradigms McClean notes, not merely drawing upon spectacle, nor being invisibly intermeshed within the narrative, but actively moving between each. However, this study sees invisibility as a constant thread that drives all such effects, since the production of effects calls upon vestiges of concealment and revelation, the visible being made invisible and the invisible becoming visible.

The following work will involve a series of close textual readings of films, and particular sequences within those films, focussing closely on how the visual make-up of the work echoes and enhances various theoretical characteristics highlighted in this

⁴ See: "Freeway Truck Crash: Anatomy of a Shot".
introduction. It will explore in particular VFX, and most pertinently digital VFX, but there will be recourse to switch back and forth between digital and analogue work in order to highlight how the continuation of VFX is in fact allied to this past work and surrounding discourses. Including this past/present dichotomy arguably allows the critical work used to shed light more powerfully upon other critics work, as well as introducing new perspectives. This is a feature used by certain authors who will be outlined in the following section. Less attention is paid to practical effects, such as make-up and prosthetics, on-set techniques and pyrotechnic work amongst others, except to draw critical distinctions between the practical – that is to say physical – and digital effects.

Previous Work.

Despite its relatively recent arrival within film studies’ field of theorisation and discussion, visual and special effects’ position within literature is a topic of concern, albeit minor. There is the already mentioned work by Christian Metz, “Trucage and the Film” (1977), which discusses both the notion of the trucage (or “trick photography”) and invisibility, both in relation to its literal use in Invisible Man films and as concept within special and optical or process effects. Metz states the definition of process effects is “a kind of divergence from ‘photographicity’” and that with the simple fade-out there is for an instant “no photograph for viewing” (659). In relation to general optical effects as a whole he sees divergence as a key, as well as the trucages in-built capacity for “deceit”. But he also notes the variable type of the trucage, in both camera specific uses akin to practical conceits, such as pyrotechnics, as well as “track trucages”, which pertain to optical and other lab produced effects and “cinematographic trucages” which are non-profilmic tricks (662). In this matter Metz was keenly aware of the placement and methodology of special and visual effects, even if he did not (by choice) wholly examine the broader existence of the craft, or its theoretical importance. However, Metz’s theoretical impulse is in line with my own, touting trick photography as an interesting and valuable part of cinema. Additionally, in regard to invisibility as a concept, Metz is also extremely mindful of its position as part of three conceptions, sat between imperceptible and visible trucages. Interestingly, Metz sees the imperceptible trucage as
something that could be profilmic, such as an actor of a different height being positioned so that he/she appears on the same level as his opposite number. The invisible *trucage*, as already noted, is seen by Metz as used in films featuring H. G. Wells’s character, as well as something designed to be wholly unseen by spectators. His thoughts on these definitions are apt, are often in line with those of subsequent theorists such as Shilo McLean (see below), and act as a strong basis upon which this thesis will build.

More recently there has been a considerable number of articles included in a special edition of the academic journal *Screen* (40.2) that marked a point where film scholars were taking CGI seriously. Each sought to highlight the recent importance of digital effects in cinema. Such articles began to demonstrate the importance of VFX as a serious subject for discussion. Each melded topicality of both the films under examination, often being recent blockbuster productions, with the nascent freshness of the subject matter. Such subject matter, plus a fittingly serious angle of analysis and application of theory, began to demonstrate that special and VFX possessed substantial merit for critical enquiry. Though debated and critiqued further following their publication (cf. C. P. Sellors’s response to Buckland, “The Impossibility of Science Fiction”), as is necessary and appropriate, these articles and others promptly emphasised that this often ignored area offered scope for scholarly discussion.

Further to this, but often in existence prior to these articles, small, discrete chapters and sections within histories of cinema produced informative and analytical debate. D. A. Cook’s *A History of Narrative Film* (1996), as part of his discussion of cinematic history argues that an understanding of special effects was highly relevant to an understanding of the overall structure of feature films. In science fiction films of the 1950s, special effects were significant components of films such as Christian Nyby’s (and an un-credited Howard Hawks), *The Thing From Another World* (1951) and Robert Wise’s *The Day the Earth Stood Still* (1951) (498). Cook argues that the implementation of special effects in these films, such as the visualisation of aliens invading Earth in *The Thing From Another World*, and the possibility and fear of Earth’s destruction in Wise’s film, reflected subtexts surrounding Communism and the Cold War. Cook furthers this critical position within his overview of narrative film by noting the inclusion of VFX to generate spectacle and narrative cohesion within Hollywood and several other countries’
film output, including Germany, the UK and other areas. This included the development of the Schüfftan process (D.A. Cook 114) and the Dykstraflex camera system (Ibid. 927n). But the inclusion of these technical details and their methodology is often part of an historical overview that necessarily sacrifices detailed discussion in order to discuss the broader relevance of special effects within certain areas of film history. Other similarly organised texts include Bordwell, Staiger and Thompson’s The Classical Hollywood Cinema: Film Style and Mode of Production to 1960 (1988), which includes sections divulging how special effects techniques were accommodated in production departments. Examples included how special effects formed aspects of mise-en-scène (“Classical Hollywood” 148 – 150) and the importance of technology as a means to sell films (Ibid. 243). The authors note: “Technology produced a new department [...] as special process work and composite photography increased in complexity and precision [...] the work of such experts became recognised as an important subdivision of the labour process” (Bordwell, Staiger, and Thompson 324). The crux of Classical Hollywood Cinema’s analysis stems from highlighting the formation of a production paradigm, in which certain technological and practical aspects became prevalent in order to create a “Hollywood” style, which was consistently repeated throughout many films. As the authors say in the opening of the book: “classical filmmaking constitutes an aesthetic style that can characterise salient features of the individual work” (3). By discussing how effects formed a part of this style, the book demonstrates that the effects positioned within Hollywood films helped to create part of a dominant paradigm.

Richard Rickitt’s Special Effects: The History and Technique (2006) is one of several more dedicated volumes that present encyclopaedic and historical accounts of techniques and technologies, including both pre- and post-digital techniques. John Brosnan’s Movie Magic: The story of special effects in the cinema (1974) is another, charting special effects practices from the earliest days of cinema. Unlike Rickitt, (and due to its publication date) Brosnan’s tome features pre-digital effects, from the “trick” films of Georges Méliès, the establishment of optical, model and miniature work, and practical on-set effects. Thomas G. Smith’s Industrial Light and Magic: The Art of Special Effects (1986), and Mark Cotta Vaz and Patricia Rose Duignan’s Industrial Light and Magic: Into the Digital Realm (1996) mirror this pre/post-digital history, as do Piers
Bizony’s *Digital Domain: The Leading Edge of Visual Effects* (2001) (focussing on the work of the effects house founded by James Cameron) and Pascal Pinteaup’s *Special Effects: An Oral History* (2004). These books, which can arguably be described as “soft literature” due to their lack of theoretical exposition, feature detailed technical text, first-hand interviews and large numbers of illustrations and photographs. This provides solid background information on how certain effects are orchestrated, and how they relate to previous effects within cinema history. As a compendium of techniques and how they operate within the wider cinematic texts, books such as Rickitt’s, Smith et al allow readers to see how effects work to provide visual images that are part of a finalised product. By outlining in detail VFX’s creation and operation this thesis aims to follow their work, providing readers with a greater understanding of visual and special effects. But in addition my work also aims to build into the presentation of technical and technological comprehension a deeper understanding of how these effects can produce greater meaning. That is to say how the images produced through VFX, and how they are created, can direct viewers to greater significances surrounding cinema as a cultural art form.

As Ray Harryhausen notes in the foreword to Rickitt’s book, that text is essentially both a tribute to the special effects pioneers, but also invaluable in “explaining not only to dedicated fans, but also to the interested general public how the magic is – and was – achieved” (qtd. in Rickitt 6). A similar use of technical and contextual information is seen in the journal *Cinefex*. Established in 1980 and primarily aimed at professionals working in the effects industries, each issue of *Cinefex* features long-form essays describing several film productions. Built up of text and photographs that show both fully finished shots and behind-the-scenes images, the journal covers various techniques and technologies used to create the films in question. Interviewing effects personnel, such as technical directors, supervisors, directors, producers and others, the essays detail how effects are created and avail the reader with considerable levels of technical information. *Cinefex* is useful in outlining the necessary details in crafting much of a film’s make-up, featuring not just fantasy and science fiction films, but many dramas, animated productions and comedies. Though these texts all lack major theoretical dispositions, sometimes using language a layman may struggle to follow, the
detailed information of how certain films create their visual and sonic structures is
seldom seen elsewhere, save for certain issues of American Cinematographer (1920 –
present). Cinefex, together with the historical encyclopaedias mentioned above, provide
important and detailed technical and background information that illustrate how many
films rely on effects to build their final visuals, and how these effects operate. Such
information is highly important to my own research, which often incorporates extensive
details of effects techniques and how they operate as part of the overall structure of a
film. Like the other soft literature outlined above my intention is to use these texts in
order to strengthen the technical discussion of the films discussed here, but to fuse their
information to theoretical positions and discussion.

More theoretical analysis of effects can be seen in books, including Geoff King’s
Spectacular Narratives (2000), which explores the modern Hollywood blockbuster and
its relation to narrative and spectacle. King examines spectacle’s position within films,
focusing on the continued relevance of American frontierism, previously seen in the
Western genre, as a narrative structure in contemporary Hollywood blockbusters. Special
effects are mentioned frequently throughout the text, with various types used as examples
of how both spectacle and narrative are generated. King’s examination of effects is seen
in his exploration of how the thrilling digital dinosaurs of Jurassic Park are also closely
aligned with classical Hollywood narrative schema. Though not wholly grounded in
special effects use, King’s analysis includes important examinations of various effects
techniques in relation to the creation of the compositional qualities of cinema. For
example, a key underlying theme posits that VFX work as a narratival tool as well as
being spectacular effects, working in tandem with characterisation and other elements of
the films’ conventional storytelling tools in order to consolidate plot and narrative. In the
films discussed, such as Roland Emmerich’s Independence Day (1996), he notes that the
use of spectacular effects not only serve to create a visceral thrill, but also as a means to
 drive the film’s plot forward. Similarly, in dissecting the T-Rex attack in Jurassic Park,
King notes that the effects might be seen as bracketed off and distinct from the story and
its human characters, creating a series of dynamic emotional responses of fear and
empathy for the characters (48). This, King notes, has been seen to intrude and cause
disruptions into the narrative, but King instead argues that the T-Rex actually physically inhabits space on the screen and also develops the narrative (Ibid.).

This approach is continued in Shilo McClean’s *Digital Storytelling: The Narrative Power of Visual Effects in Film* (2008), which also uses a wide battery of theoretical and cinematic texts specifically to analyse VFX as a part of storytelling. McClean explains how digital effects are used within modern Hollywood blockbusters to further underpin and drive forward the narrative of such films. Her introduction notes that special effects are fundamental to blockbuster films, stating: “DVFx [Digital Visual effects] routinely are cited as the means by which Hollywood is ruining storytelling” (McClean 1) She cleanly establishes her methodology by drawing upon previous authors’ writing surrounding cinema technology (including sound, colour, and aspects of VFX) in collaboration with historical and analytical studies of narrative styles within the production aesthetics and form of Hollywood. McClean states that one of her primary arguments is “that knowledge of technical tools and mastery of narrative uses of CGI […] can offer new techniques to support storytelling” (14).

McClean’s intention is to address “the purposes, quality, evolution, and narrative function of DVFx” (Ibid.). Using a series of case studies the body of her text variously illustrates how DVFx supports the creation of heroes, adaptation of narrative, and the production of film franchises. Her exploration of narratively motivated uses of special effects against the commonly held belief that effects work against the imperatives of narrative development is similar to King’s argument in *Spectacular Narratives*. Unlike King, McClean focuses more specifically on the use of digital effects rather than aspects of pyrotechnics, practical effects and other analogue special effects. The importance of these books, aside from their long-form discussion, is how effects are an integral aspect of filmmaking, and more pertinently how the apparently superficial aspects of spectacular VFX are a topic of meaningful theoretical discussion. Especially pertinent is the authors’ interweaving of technical and textual information, as well as their linking of effects to functions beyond spectacle and the dissemination of purely technical information. It is an area that I will be addressing further throughout the following chapters. Though my intent is not to dissect the areas of narrative, the relation of effects as a subject taken seriously in relation to surrounding and established aspects of cinema both as a form, and as an
area of study, is still relatively small. The thesis’ priority is to draw readers into a contextual discussion of VFX as a way of understanding anew such areas as realism, ontology, the functions of space and time and notions of physical presence within cinema and film.

An early work that set the analytical ball rolling is Michele Pierson’s *Special Effects: Still in Search of Wonder* (2002), which specifically looks at the ways in which digital effects have come to replace the antecedent analogue techniques, and how connoisseurs of such effects have digested these changes. Pierson examines the public’s popular interest with technology reported in scientific magazines of the late eighteenth and early nineteenth centuries and how the wonder generated there continues in modern writing about special effects. Pierson’s later chapters explore the so-called “wondrous” spectatorship of analogue effects imagery of 1970s and 1980s filmmaking, and how it peaked in the early 1990s to become surpassed by a new sense of astonishment. Pierson notes that the digitally augmented *Star Wars* re-releases (in 1997), “renewed speculation about the aesthetic possibilities of computer-generated imagery in the popular mass media” (96), which drew attention to a profusion of fan-centred magazines. But the curiosity and wonder ushered in by nascent digital effects, such as morphing\(^5\), was lost and replaced instead by what Pierson sees as an inability to discern special effects as special effects (134). In doing so Pierson’s text points towards the foregrounding of synthetic imagery’s properties (158), but also notes the importance of the technology as both a reflection of the present and the future settings of many special effects films. But this “technofuturism”, is seen as not providing such effects with an aura of wonder, but nullifying them. Instead, CGI effects are pastiches of past analogue techniques, with none of the craftsmanship or appreciable qualities of connoisseurship.

Pierson’s observations reflect a series of texts that discuss the constitution of film, and film culture, more than they offer actual detailed analysis of VFX techniques in specific films. In dealing with connoisseurship and fandom, Pierson subtly discusses the nuances and results of optical and digital effects upon the ways in which spectators and the public perceive and digest them. Since her debate focuses upon elements beyond the

\(^5\) Morphing is where visual elements “morph” from one state to another, such as the T-1000 cyborg as seen in *Terminator 2: Judgment Day*. 
within, the author is able to cover a number of different ideas pertaining to her central theme, but she does not use – or indeed need - a comprehensive textual analysis of VFX to support her argument. However, what Pierson’s book does demonstrate is the interest in special and VFX, both within the commercial publishing business of fanzines, the fans themselves and as an area of burgeoning academic publishing. The book highlights special effects as an important element of cinema that is worthy of detailed discussion and interrogation. In this respect it highlights the need to continue research in the subject, since a wide and diverse audience are both available and willing to discuss, digest and consume discourses surrounding special and VFX. Moreover it highlights, alongside the other theoretical books written thus far, that such an area is one ripe with tropes and matter for debate and examination.

Dan North’s *Performing Illusions* (2008), similarly uses analytical debate with rigorous textual analysis of films and their respective use of visual and special effects. North highlights how effects help create alternate realities, using a timeline beginning in the pre-cinematic age of stage illusions, through model and optical effects seen within films, the incursion of computer technology, with a conclusion discussing the modern digital age. Like Pierson, North blends historical information with critical study. But his basis in filmic texts over Pierson’s literary texts strikes a more comprehensive analysis of effects in cinema. Moreover, his discussion of alternate realities and the inclusion of digital effects within the make-up of the analogue and indexical basis of cinema are reflective of my own studies. The importance of cinematic (and pre-cinematic) history, and his engagement with special effects offering new ways to think of the cinematic form and its study is closely allied to the following chapters’ concepts and their methodology.

The main focus of Scott Bukatman’s *Matters of Gravity: Special Effects and Supermen in the 20th Century* (1993) is the position of the human subject in a world of industrial and electronic capitalism and the “interplay of controlled space and the evocation of weightless escape” through popular recreations (Bukatman “Matters” 3). The author sees spectators becoming caught up in visually experiencing sensations via the technology onscreen that have no reference to spatial location” (Bukatman “Matters” 83). Within such films as Ridley Scott’s *Blade Runner* (1982), this allows spectators to
engage with a reality that apparently defies engagement, due to the hypnotic grandeur, (Bukatman “Matters” 108 -109). Bukatman highlights how the immersion into such scenes stuns viewers into submission, reflecting the modern world’s technological bombardment (Ibid. 129). But he also notes how this immersion in unreality allows us to escape from the technology landscape of the real world through such practices (Ibid. 130).

Parts of Matters of Gravity’s contents, which examine special effects within some of its chapters, allow Bukatman to move beyond the condensed elements of the broad analytical volumes of Bordwell, Staiger and Thompson, and D.A. Cook, to develop a more detailed analysis of special effects use within cinema. The author therefore draws upon investigation, analysis and theoretical debate from within established cultural and film studies theory in order to draw out meaning and weight within the films discussed. Though only one part of a wider cultural debate, Bukatman’s text nonetheless highlights a more thorough exploration than previous authors works and highlights how the qualities of effects in modern cinema reflect the tensions surrounding the concrete and the intangible. This component is continually evoked throughout areas of this thesis, in particular towards the latter stages where aspects of the Internet, cyberspace and the use of digital technology are discussed in relation to the separation of physical objects.

Setting out the Digital Stall.

Chapter one begins by disclosing how invisibility as a technique featured within pre-cinematic media and early cinema and how, through its ability to conceal and reveal, it enabled its users to shift parameters of physical space and elements of time. The technique used was based upon a stage illusion called the “black art”, which involved enveloping a stage area and performers in black coloured cloth. This synchronisation of performers and surrounding space allowed the creation of a mode of concealment that was, for all intents and purposes, a practical construction of invisibility. By using the technique Méliès was able to exploit the properties of concealment to subvert the physical referentiality of the profilmic material to compose time and space anew. As the chapter continues, I will investigate how such techniques become incorporated into the
design of more recent digital films, in particular Kerry Conran’s *Sky Captain and the World of Tomorrow* (2004). *Sky Captain* uses an inordinate level of digital techniques to create its visual structure, including digital compositing to position digital pieces of *mise-en-scène*. But though apparently extremely modern in its technical construction, the film is imbued with a mixture of historical precedents both in narrative style and technical characteristics. Using a digital system analogous to that of Méliès, filmmakers such as Conran pulled together visual elements from disparate spatial and temporal areas that invisibilised other physical spaces. Simultaneously, these films recall past eras whilst existing in and utilising elements of a world that revolves around more technologically sophisticated factors and constituents.

The second chapter seeks to investigate the creation of cinematic realism, exploring and critiquing Bazin’s ideas alongside those of other theorists. His theories will allow us to observe realism, and more importantly physicality, as a fact of both older profilmic films and newer digital cinema. The chapter notes that physical precepts of *mise-en-scène* can be fractured, concealed, invisibilised and replaced by a multitude of digital constructs through the technique of compositing that reveal new influences upon realism and its place within various seemingly fantastic films. The concept of invisibility here discloses a new methodology for understanding cinematic representations of realism and *mise-en-scène*.

Chapter three revolves around ways invisibility is used in motion-capture, and how the technique invisibilises and creates a disruption of the physical performer. The theoretical focus surrounds the impact of ontology, or the sense of being, and Bazin’s supposition that film has the ability to “mummify”, to preserve a truthful likeness of, the subject. The chapter seeks to explore how VFX rearticulates the apparent immobility, or deadness, initially conceived by images, and how VFX works to revivify, make present, and create a sense of both “ontological uncertainty” and new existence through electronic media. Analysing films that use effects to represent ghosts and characters revolving around death, the chapter argues that VFX within ghost films, and moreover mocap characters, evoke a strong sense of being and revivification, but also extrapolates ideas surrounding uncanniness that promote sensations of unease and dread.
The final chapter discusses aspects of new media and cyberspace in relation to recent iterations of the Invisible Man, seeking to cement and finalise the study’s theoretical explorations through the character and how it exists as a digitally produced form. In its modern form the digital version of the Invisible Man character reflects sensations surrounding characteristics of the modern digital age, of the Internet, and capacities of the Worldwide Web. In particular the chapter notes how the apparent freedom of the body represented through the modern Invisible Man reflects the apparent liberation, abandon, and freedom of the digital world as well as the collaboration between man and machines. This is measured against aspects evoked in the literature and characters of cyberpunk, along with the figure of the hacker, and is counterpoised against earlier analogue versions of the character.

Hollywood is often central to many of the following chapters contents, and the reason for the focus on Hollywood productions and infrastructure is manifold. As Cubitt points out, “Effects are most commonly associated with creating images of scenes, events, and characters that do not exist in the real world or that cannot be photographed, but they are also used for economic reasons” (“Special Effects” 117). The visceral impact of sound and VFX, rather than subtle nuanced performances based around the interaction of actors over spectacular effects, can generate great and immediate on-screen interest. Though King, McClean, North, and others note the use of such effects as supporting narrative and the production of performances, these effects also support the economic needs of Hollywood studios’ big-budget production system. As King posits, the concept of frontierism that is central to his text is necessarily built upon “spectacular intrusions into the daily life of the viewer” as well as building narrative structure (5). But, in simpler terms, such spectacular, effects-driven films are more readily accessible to viewers of all languages and are therefore more commercially viable to non-English speaking countries. Hollywood can more easily sell something that has broad visual and sonic impact, and as a result there are many films that can be discussed. But, because of their broad appeal and bold visual schemes, popular films of this nature are often deemed as lacking depth. Seen as flimsy spectacle, critics and academia often ignore them over films that feature less VFX. But analysis of the actual deployment and use of VFX are arguably just as
important, as Pierson, North et al have shown. Consequently it is an intention to instil a
greater sense of worth by adding to the works outlined in the literature review.

Another reason is Hollywood is often at the forefront of effects production.
Though the likes of Méliès and other British and European technicians have been at the
vanguard of effects creativity, a considerable amount of work is funded and/or taken
forward by Hollywood. Certain British, European and other non-US effects personnel
and companies work on Hollywood films, as do directors (including Roland Emmerich,
Guillermo del Toro, plus - at points in their careers - Paul Verhoeven and John Woo).
This is partly due to the high budgets required for effects-driven films, such as Roland
Emmerich’s 2012 (2009) and Guillermo del Toro’s Hellboy (2004) and the necessity of
financial backing to create these effects. This combination means a large proportion of
special and VFX productions come from the United States and Hollywood and, partly as
a further means of “selling” the films and the artists themselves, are written about in
considerable detail within behind the scenes and other “soft” literature outlined above.
Though not all effects are spectacular (as McClean notes in her fourth chapter (69 – 72)),
the uses of effects are often designed for spectators to enthusiastically observe and
decode beyond the limits of the films themselves. It is a quality that Pierson’s Special
Effects: Still in Search of Wonder underlines and these discursive texts, in combination
with other academic books, can be repurposed to re-engage with these films on an even
more expansive level.

This wealth of information and film texts are therefore an abundant source from
which a scholar can work. Yet, though considerable literature does exist, the scope for
investigation is currently still wide. Historical overviews and detailed explorations of
effects and effects houses, such as those written by Rickitt, Brosnan, Pinteau, Smith and
Cotta Vaz etc., are useful for both casual readers wishing to discover considerable and
comprehensible information on techniques and people. Similarly, publications including
Cinefex and American Cinematographer, provide expanded details for those wishing to
understand even more comprehensively how effects exist and operate within Hollywood
films. For those wishing to create their own special effects a number of publications are
available to enable burgeoning craftsmen and craftswomen to produce their own digital
and practical effects (see Brinkmann, Sawicki, and Debreceni). These texts are useful for
the reasons stated, and moreover my own research often draws upon similar aspects in order to avail readers of how such effects are presented to audiences. Their use of interviews and information is advantageous in delivering and providing further information and detail to the reader.

Importantly, this allows readers to understand the *hows* of such effects, but often it is only with the addition of texts examining aspects of cultural and filmic studies that are based upon special and VFX that the thesis can operate as an analytical and theoretical text. By using such studies (North, McClean, Bukatman etc.) the chapters not only show *how* effects work, but also *why* they work in the way that they do and what their operations might ultimately *mean*. Certain books, chapters and journal articles within other volumes do function on such a level, but their numbers are still relatively small and arguably must be built upon. As noted above, though many examine special and visual effects, the majority do so as technical exercises, with histories of cinema often cataloguing special effects as elements of spectacle and as a reflection of production and surrounding commercial effects of certain periods. Others, such as McClean, diligently and successfully examine the place of special effects as a component of narratives, and their operation beyond pure spectacle. Book-length studies of special and VFX are valuable, but are still small in number.

Michele Pierson underlines the importance of the past in discussing the present of VFX, arguing that “we can’t know what is new, or different, or special about currently available ways of responding to CGI effects if we don’t know anything about the forms that popular information, speculation, and review of special effects took in the past” (4). Such arguments are vitally important, for the consideration, theoretical ideas and information that follows is not possible without contextualisation and considerations of that which has come before. The following study therefore draws on existing information, but seeks to imbue such work with new ideas and to open up new avenues for future discussion, making the previously invisible visible.
Chapter One: Méliès, Black Art, Time and Space

Introduction.

In his discussion of early cinema in Russia, Yuri Tsivian quotes the physicist and philosopher Ernst Mach, who noted, “cinematography opens up the possibility of changing the scale and direction of time to suit ourselves” (qtd. in Tsivian 57). This highlights an interesting point, that early filmmaking could readily deliver an alternate set of spatial and temporal paradigms. In his chapter on projection techniques, Tsivian examines several different processes employed by early film exhibitors outlining how the speed and direction of the films, including those produced by the Lumière brothers, produced something mysterious, strange and strikingly unusual (49 – 65). Films such as La Sortie des usines Lumière/Leaving the Lumière Factory (1895) and Démolition d'un mur /Demolition of a Wall (1896), exist as proto-documentaries showing ordinary people and their everyday activities. But the latter - which shows workers knocking down a wall – was known to have been projected backwards as well as forwards, like many others (see Christie 31). This reversal, after the initial forward motion produced an early special effect, a trick borne out of the capabilities of the projection mechanism. The camera and film are allied with time to create a scene that might force audiences to confound their expectations as Tsivian describes.

By using the physical elements of celluloid film, in particular the sensitive abilities of film emulsion and editing, and the physical attributes of a performer and settings, a director – such as Georges Méliès – could actively reorganise the filmed world to create a diegetic space of almost infinite possibilities. By using a series of practices involving black, negative spaces - spaces of seeming invisibility – a filmmaker could rearrange and recreate the spatial and temporal aspects of cinematic space to quite outlandish and fantastic degrees.

This first chapter will be examining practices that surround Méliès’s work, and how they become central to the following contents. The establishment of invisibility as both a concept and VFX technique can be seen as engendered by Méliès, but its path begins prior to the cinema, born out of stage illusion techniques by those fellow
illusionists of the Frenchman. This focal illusion – to both Méliès, this chapter and those
that follow - is the black art technique, where the stage area and performers were draped
in black cloth in order to create invisibility. As the chapter unfolds I will discuss the
historical and theoretical placement of the black art and how, in its cinematic equivalent
and refinements, it creates a type of controlled disorganisation of temporal and spatial
conceits within Méliès and others’ films, creating absence and presence through
invisibility. Exploring Tom Gunning’s conceptualisation of “unseen energy” in Méliès’s
films through invisibility, and theories concerning unicity, and Trish Pringle’s discussion
of stage illusion’s ability to make structures intangible, and their masking of space and
size, I will analyse films including Le Voyage dans la lune/A Trip to the Moon (Georges
Méliès 1902), through to Kerry Conran’s Sky Captain and the World of Tomorrow
(2004). These, and other films I will argue, employ the cinematicised versions of the
black art to change temporal and spatial structures, which leads to a reorganisation and
unity of diegetic and non-diegetic space, leading to new understandings of the temporal
placement of the media in play, a factor discussed through Jay David Bolter and Richard
Grusin’s Remediation (2000). Their work, focussing upon the interrelationships,
organisation and use of media within the digital and analogue ages, allows a greater
understanding of how the VFX techniques relate to each other across different films and
periods.

During the first years of cinema Georges Méliès, like many others, was enthralled
with this new technology. Méliès witnessed a series of flickering images flashing before
his eyes that immediately reverberated with the illusionist and owner of the Théâtre
Robert-Houdin. Whilst seated at the first screening of the Lumières’ films, previously
frozen pictures suddenly moved, and Méliès later commented: “We were all positively
stupefied. I immediately said ‘That’s the thing for me … an extraordinary trick!’” (qtd. in
Ezra 12). The Lumière Cinématographe united several technologies and cultural forms,
situating photography’s finely detailed and realistic representations of people, objects and
locations with the still popular large scale and spectacular projections of a magic lantern
show within one sole machine. What Méliès saw whilst viewing these enmeshed
technologies and techniques was something often akin to extraordinary wonder, as he
recorded: “We sat there with our mouths open, without speaking, filled with amazement”
(qtd. in Ezra 2). Maxim Gorky conversely sees the Lumiéres’ work as not unerringly amazing in a positive way, but with dubious overtones. Gorky said of his initial viewing:

This mute, grey life finally begins to disturb and depress you. It seems as though it carries a warning, fraught with a vague but sinister meaning that makes your heart grow faint. You are forgetting where you are. Strange imaginings invade your mind and your consciousness begins to wane and grow dim. (408)

More incredulous than Méliès, arguably Gorky’s view was that cinema invaded and usurped mental preconceptions of where he was situated, losing his temporal and spatial position whilst viewing. Nonetheless, his thoughts continue to highlight cinema’s ability to play with perceptions of what is witnessed on-screen.

Elizabeth Ezra notes the reason for such amazement was more important than just the sheer wonder, positive or negative. She states that “What appeared on the screen seemed real, and this very realism seemed magical” (Ezra 2), and this, coupled with the sudden inversion of reality as films were run backwards in the coming years, as outlined by Ian Christie (32), could only compound such magical surprise. For the illusionist and showman in Méliès, who had spent the past several years delightfully tricking audiences with sleight-of-hand and techniques of deception on stage, the ability to create similar wonders through the use of technology, to seemingly unbind the real world’s constitution, must surely have been an attractive notion.

Procuring a similarly designed camera-cum-projector (an unauthorised copy of Edison’s Kinetoscope from R W Paul called the Theatrograph⁶), Méliès set about filming his own productions in 1896, with the actualities Une Partie de cartes/Playing Cards and Jardinier brûlant des herbes/Gardener Burning Weeds. Soon after, Méliès also began to produce films that revolved more explicitly around tricks, using a series of techniques that allowed him to transpose stage magic practices onto film. Méliès himself wrote that

---

his eureka moment initially came when his film camera accidentally jammed during the shooting of a street scene at the Place de l’Opéra in Paris. Méliès fixed the jam and continued shooting, but upon viewing the film he discovered that the disjunction resulted in the film showed an omnibus suddenly transforming into a hearse and a group of men instantaneously transformed into women (Ezra 28). Whether this explanation is real or apocryphal, films such as *L’Escamotage d’une dame chez Robert Houdin/The Vanishing Lady* (1896) did indeed begin to exhibit the ability to instantaneously remove and replace performers with objects and other performers in similar ways to the transferences captured outside of the Opera. This stopping and restarting of the camera, in combination with the change in vehicles and other material before the camera, demonstrates an excellent destabilising of the physics of time and physicality of space. Through this, Méliès was able to rearrange different spatial and temporal areas ultimately within the diegesis. Soon Méliès began developing further techniques, many directly marrying the art of stage magic to the new art of cinema; techniques that could further expand the rearrangement and destabilisation of cinematic elements.

**Assembling Methods and Achieving Dreams.**

Among these other techniques, one in particular becomes of importance to my investigation: the cinematic interpolation of the “black art” technique. The black art was already well known within the fraternity of stage illusionists, having been used by performers including Max Auzinger and Buatier de Kolta. Its basis revolved about the draping of an entire stage area with a black material, most often a light-consuming velvet, which created a cavern-like space that allowed similarly clad performers and objects to become concealed from audiences. Through careful use of lighting around the mouth of the stage, which caused a strong differentiation between the light exterior and dark interior of the cavern, the concealing effect was one that worked very well (see Figure 2.1).

---

7 This technique can also be seen in *The Execution of Mary Queen of Scots* (Alfred Clark 1895).
The technique allowed a series of illusions to be produced including the “Skeleton Dance” and the “Vanishing Horse” (both performed by Max Auzinger under the stage
name of Ben Ali Bey during the late 1880s and 90s). In each, the illusionist would work in close harmony with a series of black-clad assistants who would hide and unveil the necessary objects, and animals, and also operate any contraptions, such as moving the skeleton (against an arranged blackboard within the cavern) or producing soap-bubbles.

Such a technique was but the latest and perhaps the best in a long line of illusions that created and employed concepts of invisibility; concealing assistants or objects from spectators, in order to suddenly make them appear and disappear when necessary. Other examples prior to the black art included containers, which secreted a person, persons or objects via compartments. A key technique was based upon mirrors and other optical devices devised with glass, such as the myriad tricks developed by Charles Morritt. In each technique, a series of physical structures were used to obscure the reality that lay within, for example through secret compartments that completely conceal by total encasement. Though also a conjuror – drawing flowers through a previously spun tissue paper-covered hoop (and therefore out of thin air) often began his act (Steinmeyer “Art” 120) – Morritt was well known for his development of a series of disappearances from cabinets and other spaces.

The success of such tricks lay not only in the compartments concealing the assistant but the glass, which precisely reflected a specific point to the watching audience. Such illusions were dependent upon so-called sightlines and safe zones. Sightlines, explains Steinmeyer, are “imaginary extreme lines of vision, the boundaries of what an audience will see or what they will be prevented from seeing” (“Elephant” 80). These sightlines, Steinmeyer goes on, must allow the audience to see the action on stage, but should not allow a spectator to view stagehands, the mechanics of the illusion, or

---

8 In “Goodbye Winter”, for example, an assistant climbed a ladder laid against a series of stacked tables that grew incrementally smaller to create a ziggurat or pyramid shape, before slipping beneath a long tablecloth that completely covered the top table (Steinmeyer “Art” 129). Immediately she slipped underneath it, Morritt whisked away the cloth to show that she had disappeared. To produce the illusion, Morritt used a combination of trapdoors and, more importantly, mirrors to conceal and make the assistant invisible, with the mirrors placed at precise angles to reflect particular elements of the surrounding location. “Hello Summer”, conversely, reversed and reworked the illusion, with the assistant becoming suddenly revealed from within a solid, trapezoidal construction, or “an obelisk with the top cut off” (Ibid.).
indeed any concealed performer (Ibid.). In each case the trick worked to a great degree, but the tricks required quite bulky structures, which in many ways were obviously visible. Though such structural forms were variously camouflaged or self-effacing so as to confuse an audience’s perception, they were still manifestly boxes, trunks, cages and so forth; giving audiences the obvious inclination they were concealing something. The obvious benefit of the black art was in its stripping away of these seen and knowable structures; save for the overarching stage itself. Though still requiring a level of rigging to produce, the use of blackness in all of the elements meant it was perceived as a negative space of nothingness and a sense of invisibility could therefore be housed within. This sense was produced through the black colour of the props and performers used in the action, which sat against the similarly dark recesses of the stage. Layering the analogous colours of the stage and props against one another created a highly malleable space that could conceal and thus invisibilise considerable levels of people, props and other elements. Such an extensive space was designed to confuse audience’s expectations, making them unsure as to where the revelation would emanate from.

In its concealing abilities, the black art technique was particularly congruent with the new techniques of film. In essence the cinematic black art utilised an already existent form of invisibility. By placing anything of a consistent level of blackness against a black backdrop, the illusionist can naturally make something or someone invisible, and anything bright or coloured becomes more starkly visible. A similar technical system essentially exists within film – wherein the frames of film stock, coated with an emulsion receptive to light, will change dependent upon how much light is cast upon them. If a film frame is washed with light, reflected from the various photographed surfaces through the lens onto the emulsion, it will become visible to one degree or another, creating a series of gradated tones. The opposite effect will therefore produce opposite results, so that if no light is reflected – for example filming a black surface, or surfaces – the emulsion will remain pristine and un-tampered with (i.e. black/transparent). If a filmmaker were to film a black surface for a period of time, such as a stage, it would not sacrifice the other areas of the frame, enabling him or her to rewind the film and re-shoot those same frames. This theoretically allowed the director to imprint whatever was latterly shot onto the frame, and anything or anyone dressed in black to remain invisible,
so long as they are photographed against the black background. Moreover, anything partly concealed will be partly perceptible. In summation, Méliès demonstrates that the black art technique produces sequences in films in which the degrees of concealment and revelation could be controlled. Therefore a conceptualisation of invisibility was effected by the process, allowing Méliès to make films which were greatly structured about making the visible invisible, absence present, and vice versa. But more importantly, as I will now illustrate, this technique allowed a further radicalised transformation and destabilisation of time and space within his films.

In conceiving of and constructing his sets, backdrops and mechanical devices in *La Conquête du pole/Conquest of the Pole* (1912), various vehicles such as balloons and helicopter-aeroplane like contraptions, Méliès created far-flung, stylised worlds and vessels. These often defied real-life logic, yet they were still comprehensible to an audience. During the first half of *Conquête* these model craft fly across a series of painted backdrops representing snowy mountains and cloudy skies via a combination of wires that suspend them, and moving backdrops that revolve to produce the illusion of motion. This combination allows the models, sometimes in almost full-scale, as during the plane’s vertical take-off, to be moved up and down to illustrate shifts in height and motion, effected by personnel controlling the models via cables in gantries above the set.

As Suzanne Richard notes, Méliès was one of the first cinematic “architects”, a builder of worlds and environmental elements that did not rely upon the usual constraints that real architecture (and other elements within) had to fulfil. Richard remarks that Méliès was one of many who “took advantage of film to achieve their dreams” (47). In Méliès’s case the director was able to transfer thoughts, visions, and ideas generated by his mind into his films. The director reorganised and appropriated real space in order to build a series of new imaginary visions, by using light materials such as *papier-mâché*, fabric and canvas. This took audiences into new dimensional spaces and can be seen throughout many of the more prestigious films, including *Conquête* as well as *Le Voyage dans la lune* wherein we see the passage of the rocket ship as it descends towards the Moon’s surface, the astronomers’ expedition once there, and their fall back to Earth. Such techniques allowed Méliès to produce films that repositioned an audience’s perspective, placing them vicariously within other times and spaces, beyond their usual day-to-day
lives. Through such world-building techniques Méliès created a series of diverse cinematic spaces for them to dwell in for the film’s duration. In so doing the visuals produced by Méliès’s féeries would instil a basic impression of destabilisation, a somewhat controlled disturbance of reality created through a series of architectures. Architectures that, being made of miniature models and scenery that were both built and realigned by Méliès, and ultimately of light, are themselves made of detachable and tenuous forms.

**Shifting Dimensions/New Mechanisms.**

However, this volatile set of perspectives was by no means discernible merely in constructed backdrops, models and other tangible elements of mise-en-scène such as props, nor so controlled and ordered. The black art enabled Méliès to develop techniques that also arrange a series of temporal and spatial elements together, which can be seen working on a number of cinematic levels.

An elementary example can be seen in the take-off and voyage sequence of the rocket in *Le Voyage dans la lune*. Méliès uses a “single” shot (a proclamation that shall be reviewed below) to show a quasi-point-of-view outlook of the journey as the astronomers and audience approach their destination. As the shot progresses the Moon grows larger and larger in the dark sky with (non-moving) clouds framing the extremities of the image. The closer to the destination “we” get, a more detailed and indeed fantastic lunar “face” comes into view; from a hazy countenance with wide eyes and mouth to a human-like visage which smiles only to have the rocket to enter the frame and slam into its eye. As noted, the shot ostensibly appears to be singular and unbroken, and seems for most of its length as if it is a point of view shot. However, with the sudden entrance of the rocket ship, and the unchanging position of the clouds at the sides of the frame, we can see Méliès re-appropriating aspects of space and time. The shot is in fact a series of shots linked together through substitution splicing, using a succession of three different elements: a hand-drawn Moon; followed by a performer’s face swathed in make-up; and ultimately a shot of the same made-up face with the crashed ship now in its eye. Each
shot is composed upon a black background within the cloud frame, allowing Méliès to construct his final composition though a cinematicised black art, using the intrinsic invisibility of the unexposed areas of the film frame to enforce the methodology, and it is this use that begins to create instability of time and space. Moreover, the shot(s) highlight(s) the ability of the technique to both conjoin and destabilise the elements, and consistently depends on the conceptualisation of invisibility in order for them to occur.

This scene, though essentially reliant upon the costumed performer to obscure his figure and only using the black art peripherally, draws upon the technique’s conceptual use of invisibility due to its combination of three separate images, joined together to produce the illusion of a single shot. On an initial level the arrangement of the three individual shots highlights a harmony of time and space within the finished film. Primarily the spectators, as noted previously, witness what appears to be an uninterrupted point of view (POV) shot of the astronomers’ passage from the Earth to the Moon. On a secondary level, however, we are witnessing a congruence of different temporal elements, with each shot asynchronously photographed by Méliès, and the POV shot is shown to be false. Indeed the first section, consisting of the painted Moon and ever-present and unchanging clouds, would have been prepared before the film was shot, painted and put together by Méliès and his company. The second and final thirds would then have been shot one after the other in order to produce the final combination; although Méliès carefully pieced his films together in “post-production” and wasn’t reliant upon simply stopping and re-starting a single piece of film to produce the Moon’s transformation, simple practicality would permit that the scene was shot in some kind of order. In doing this Méliès could carefully compose the shot, endeavour that the performer was aptly concealed, and his make-up perfectly composed both for the camera’s advance and for the rocket’s impact. Nonetheless the techniques of cinematic production had to be married to those of the stage in creating the scene and without the use of the black backing, which allowed a simultaneous fabrication and fusion of disparately shot elements, and substitution splices, the final shot would not be so effective.

Such production techniques highlight a first step in showing how the invisibility generated by the black art destabilises temporal and spatial elements. It must also be
noted that the fabrication of the moon via the concealing of the performer’s head and, more importantly, the rest of his body, entirely destabilises conceptions of space, time and weight. Watching the two-dimensional painting of the Moon subsequently becoming an anomalous mix of tangible elements - yet intangible due to their cinematic presentation - constructed out of performer, papier-mâché face and black backdrop, creating uncertainties surrounding its construction and meaning. How do the estranged series of scales fit together – does the audience see a man, a Moon? How big is this head, already changed through projection? Indeed, through the analysis contained herein it is possible to understand that the whole scene is constructed asynchronously using a range of elements and practices. Though contemporaneous spectators would have different expectations of this nascent media compared to later periods, they might also have begun to question what it is they are seeing and how this is happening. Though modern scholars and audiences do have greater levels of comprehension as to its creation and meaning, it is important to note that the atemporal schisms do still exist.

To a certain degree, this continues aspects of stage illusionism and how aspects of time and space are dealt with by the illusionists, and perceived by spectators. Trish Pringle, in her article “The Space of Stage Magic”, explores creative practices used within stage illusions of the second half of the Nineteenth century, noting “impossible operations such as dematerialising, defying gravity, vanishing, leading to an ‘architecture of lightness’ [where] buildings become intangible, structures shed their weight, and facades, become unstable dissolving into an often luminous evanescence” (334). As with the creation of cabinets, and the use of mirrors, which conspire to deceive and obfuscate aspects of space, Méliès’s films can be seen to similarly invisibilise spatial parameters. For example, Pringle’s piece notes innovations such as a table that used bevels and broken contours, “bewildered” the eye in order to conceal (335) and such aesthetic practices, used to falsify perception of where a person or object had gone, can be seen cinematicised within Méliès’s work. Using the black art, Méliès constructs new perspectives surrounding the spatial-temporal position and dimensions of the “Moon” in Le Voyage, changing the spatio-temporal constraints of the non-diegetic area, and deconstructing the original diegesis of the photography.
Such ideas and concepts as these continually appear in Méliès’s films. He often began by using (and playing with) the essential visual indications of space and time: set decoration, props and a combination of performers, costume and make-up. The director then exploits aspects of scale, weight and position in time and space and furthermore realigns and transforms them. In Les Affiches en goguette/The Hilarious Posters (1903) for example, Méliès produced a narrative that assembled a series of posters containing different characters that come to life. When they do, certain posters’ characters are of a different scale, including one featuring triplets who are situated in a way that creates a miniaturised stature. Such visual cues start to unhitch the ways in which the diegetic world is perceived, but these viewpoints are placed within a somewhat discernible and concrete foundation. Slowly however, Méliès interposes a series of adjunct elements that further disjoint visual perceptions of scale, space and time, and the diegesis of the film, often without their realisation.

Titles and narratives of a production, similar to the example of Voyage dans la lune, can immediately flag the viewer to expect something more fantastic. In Le Voyage de Gullivers à lilliput et chez les Géants/Gulliver’s Travels Among the Lilliputians (1902) a series of four scenes are connected showing Gulliver’s journey through various fantastic worlds, each one developed around depicting multiplicities of size, scale, space and time, initially using the aforementioned visible elements, employing a literal “architecture of lightness” though the optical possibilities of cinema and the black art technique. The four scenes/five shots show Gulliver: arriving in Lilliput, stepping across the small buildings of the world; awakening from sleep to find he has been tied up on the ground, to be speared, prodded and inspected by the tiny people from a building above; a now freed Gulliver feasting and being welcomed by the rulers and governors; and finally a two-shot scene where the now relatively tiny Gulliver is firstly scrutinised by some giant Brobdingnagians and secondly tries to converse with a Brobdingnag lady by climbing up some tiny steps, only to fall backwards as he does so. As with Voyage dans la lune, Méliès might regard that his audience would already be cued into an awareness of some buckling of time and space due to the fantastic basis of the film’s narrative, being aware of Swift’s original novel. Méliès bolsters this, using a degree of visual distortion in scale generated primarily upon the physical props and sets that clearly show
the different size of Gulliver to the Lilliputian world, playing with perceptions of space through the film’s employ of Lilliputian vs. real-world architecture, and through the optical tricks, aspects of invisibility (cf. Pringle’s notions of vanishing). This includes the first scene as he strides over the buildings, and subsequent scenes where Gulliver is immensely bigger or smaller than other pieces of the set in a shot. An audience would immediately begin to note the differences of the film’s reality to their own through this use of props and differences in scale, a sense further compounded through the insertion of Lilliputians or Brobdingnags into the film.

Such an effect is centred upon the use of the black art, wherein the scene would initially be shot with part of the frame blacked out, in order for it to be rewound and re-shot, this time with the part of the frame initially shot now blacked out. This alternate blanking out enabled Méliès to insert the new element of miniature figures (actual performers shot in disproportionate scale) onto the virgin film emulsion and, as before, rework spatial volume and scale, as well as time. Though the temporal flow appears to have not been disrupted, it nonetheless was, reflecting and concentrating the visual disruption the visuals created in transporting audiences to Méliès’s cinematic worlds. The second scene in particular illustrates this very well, using a distinct area of the shot to contain Gulliver and another to contain the Lilliputians. The first has Gulliver tied up on the ground, below a gantry-like portion of a building upon which the Lilliputians stand and gesticulate and throw spears at his prone body. Each portion of the frame uses live action, but though it appears to be a single shot, once again Méliès uses the black art to combine multiple elements together; each being shot in a different temporal period and staged so as to create highly different scales of size and volume. Due to its concealing properties and conceptualisation of invisibility, the black art allows the two parts of the scene to be combined together, demonstrating a complete reallocation of scale, and time.

---

9 The initial shot of Gulliver would necessitate Méliès and company blanking out the whole area above his tied body, before rewinding and re-shooting the scene, this time blanking out the area in which Gulliver lay. During the second stage of shooting the camera would be repositioned significantly further back in the studio in order to produce a sense of minute scale to the performers being filmed in the finished film. The performers would then throw the spears down upon an oversized wooden outline shaped as Gulliver’s body, allowing the spears etc. to stick into this and, in the composite image, appear to stick into a real body.
in the final shot. The invisible nature of the black art’s compositing allows Lilliput’s ancient and mythic, and therefore destabilised space and time, to be ultimately realised. Furthermore the technique’s use makes the artifice of the Lilliputians’ creation also hidden and invisible; absence becomes presence and vice versa. The black art’s technique of invisibility makes the actual similar scales and concrete reality of the actors and sets wholly invisible and impermeable to audiences, allowing a secondary destabilisation of time and space beyond the final visuals seen, following those principles discussed by Pringle’s article.

Méliès is here already beginning to move beyond concrete visual stanchions, unfixing the elements of the perceived diegetic reality, and also establishing the black art as a tool that wilfully and aggressively plays with and re-orders visual elements in more discrete and complicated ways. Such devices and their conception increasingly stand out within certain films in his canon, with the black art essential in creating fluctuations and volatility in the paradigm of temporality and space. Using the black, negative, and therefore “invisible” nature of the frame, Méliès positions new visual elements from other spatio-temporal zones into the blank space, which are themselves constructed from other visual elements and performances. But in addition to this compositing of conspicuous visuals, Méliès also uses the black art to more completely restructure the diegetic world and our reading of it.

Notionally then, Méliès uses the technique to combine two or more manifestly visual elements together to show palpable results; filling the space with noticeable visuals to tell a traditional story, as in the case of Gullivers and Voyage dans la lune. But furthermore, Méliès moves to conceal more and more of his new and still temporally disparate visuals, which in turn produces instances of storytelling that are ever-more unbound from the usual concepts of space and time. Méliès employs the black art’s inky dark negative and invisible framework to transform the frame’s integrity, reenergising its structure to ultimately produce a more energetic form. It is the use of black art that begins to demonstrate how invisibility can subvert spatio-temporal continuity. More than merely combining sets, props and characters as in Gulliver, Méliès begins to combine a series of bodies, spaces and props which are themselves constantly spatially and temporally dislocated, both within the timeline of a film’s production and more importantly within
the film’s frame too. It is a concentration of elements producing a series of energetic, habitually unbridled and rampanty energetic images.

Tom Gunning posits this as a form of “unseen energy swallowing space”, wherein filmmakers would use the camera to invade space and transform it (“Unseen” 365). Gunning focuses on Méliès’s use of the camera as a printing press, with the black art able to create multiple images within one frame that were ambiguous, contradictory and liberated (“Unseen” 359). It was the black art’s ability to both conceal and reveal, to make images both visible and invisible that made it so vital to both Méliès’s employment and Gunning’s subsequent discussion. Gunning focuses on Le Mélomane/The Melomaniac (1903) as a key example, where Méliès’s musician and leader of a troupe of chorus girls throws his repeatedly regenerating head up onto a wire set in a black night sky, where they become notes on a musical stave. Here Méliès again combines a series of separate elements into one final, arranged shot; using the wide black background of the film’s night time setting as both a repository for the technique, and for his ideas. Gunning situates Méliès’s note-heads as “midway between letters and objects”, highlighting how the basic object is unfixed and remodelled through the trick effect, leaving questions surrounding its concrete meaning (Ibid.). It is an exploitation of the frenetic energy that the camera (in combination with the photographed area) provides, where reality is destabilised and usurped. The continual and zany life of the heads above, existing without apparent sustenance from their normal bodily trunk and seemingly without recourse or care (perhaps revelling in their newfound singular freedom) is highly enjoyable and theoretically comprehensible to Gunning’s premise.

But beyond this, I believe further destabilisation can also be read, preceding the film’s final composition. By reaching back into the timeline of the film’s production and discussing the ways in which the final shot was created, we can see how the dislocation of temporal and spatial bases are always in play, though they are always invisible to the audience. As I shall now illustrate, the film’s production was wholly dependent upon the concealing factors of the black art even before its final composited form and allowed the concept of invisibility to simultaneously produce destabilised effects both onscreen and off.
Le Mélomane permits Méliès to conceal and keep invisible various body parts that are always disparate, liberated and fractured in time and space, continuously playing to Gunning’s theory even before the film is completed. During filming Méliès has to “remove” his own head seven times, a feat which is achieved by covering his real head with a black balaclava-like covering, making it invisible when shot against the black backing of the set (see Ezra 30 – 31). Whenever it was time for the next head to be thrown upwards the film was stopped and Méliès covered his face and head and, making sure he was standing in the correct area of the set for continuity, he would stand with a fake head positioned in front of his own. The film would be wound on and Méliès would toss the fake head upwards toward the area of the telegraph wire where it would ultimately appear as a living duplicate in the finished film. He would then stop filming and remove the balaclava, continue filming the scene and repeat the action until all of the necessary additional heads were “in place”. Similarly, and after the entire film had been performed at ground level, Méliès would again re-shoot and capture the head-notes landing up above on the wires in the night sky.

Because the set behind and above was almost entirely blacked out, save for the painted telegraph wires, a house and landscape in the background, Méliès was always able to keep the current and forthcoming head-notes and the head removal scenes invisible before they appeared. This in turn produces a dialectical tension that exists both in what is and is not seen - ultimately within the film, but also with regard to the techniques used. Such filmmaking techniques demonstrate an unrestrictive, unhinged and fractured use of time, space and scale, which allows both the filmmaker and the audience to view the formation of performance, narrative and filmmaking techniques respectively in a strongly unfettered manner. And in order to create the energetic, chaotic and destabilised, characters, worlds and narratives of his films, such as those within Le Mélomane, Méliès also had to physically disconnect his on-screen self through the use of the cinematised black art. By continually destabilising his actual form from the norms of

---

10 To achieve this Méliès filmed his head up on a gantry above the main stage, with his body concealed behind a black covering set up on the gantry. The head-note would be photographed for the entirety of its own performance, singing and acting autonomously, and the film would then be rewound to the beginning of the second head-note’s performance in order for it to be similarly completed and so on.
time and space and using the black art technique to reject certain traditional performance standards often seen in cinema, Méliès produces a series of unstable and chaotic standards of performance, both during the production and within the finished film.

**Dislocation, Simultaneity and Absolute Inclusion.**

Such observations illustrate that by using the black art to make parts of his form invisible, Méliès is continually able to break away from reality and physicality, both on-stage during production and ultimately within the film itself. Such a technique and its implementation exemplifies how Méliès could marry a series of disparate elements, challenging the positions expected of the human body in performance, translating them through the cinematic permutations of the black art into anarchic revolutions of space and time. Despite being filmed five years before *Le Mélomane*, Méliès uses the black art with equal dexterity in 1898s *Un Homme de têtes/The Four Troublesome Heads* to demonstrate his ability to displace numerous spaces and temporal elements. Analogous to *Mélomane*, this earlier film features Méliès in a blacked out space, this time accompanied by two tables and a stool, and shows the director conjuring a series of new heads, which then live and consciously act independently for much of the film’s brief length. These three other heads are once again produced through a combination of the black art, with the director acting as the progenitor of the multiple heads, together with substitution splices.

As the film begins we see Méliès remove his head and place it onto a table on the left of the screen before miraculously re-growing a new head. Méliès clambers beneath the table to show the space is “real”, before repeating the self-decapitation feat twice more, with the second head being placed next to the first on the left table, and the third on the right hand table. With all three doppelgangers now quite wildly
acting of their own accord, Méliès again grows another fresh head and then picks up a banjo, which he begins to play, only for the other heads to join in a sing-along. Their sudden singing and disorderly conduct causes such a racket to the fully formed Méliès that he swiftly makes the two heads vanish from the left table with a swipe, removes his connected head once again and tosses it away before replacing it with the last remaining head on the right-hand table. He bows and the film finally ends (see Figure 2.2)\textsuperscript{11}.

These executions express the dislocation of the temporal constant finally seen, with each new head being shot at quite wildly different points in the production, and furthermore the dislocated head embodies a transmutation of space, following Gunning’s theory of energy issuing into the areas of the screen and distorting its spatial properties. In his “Unseen” article, Gunning discusses The Hale’s Tour films, positing these short productions also created a sense of release and freedom within their diegetic space. The Hale’s films placed audiences inside a mock-train carriage with location footage of an actual train journey projected on a front wall. These stage-based and film elements were placed together with sound effects, a real-life conductor and train-like motion, produced by mechanically rocking the carriage, to create a reconstitution of “the thrill of motion and its transformation of space” (Gunning “Unseen” 362-3). The consequences of this, as with Méliès’s films, is that cinema of this style produces an opening up of the apparent confines of what is seen and therefore initially experienced. Perhaps the Hale’s Tours production might at first seem the more productive use of the unseen energy flooding at the spectators. Being seated within a stage set and seeing an exterior flowing past, quite probably one which would be different to the location in which the Tours experience was stationed, together with the attendant motion and noise, would in relation to the physics of the stage-based elements certainly expand the initial diegetic event.

\textsuperscript{11} As with Mélomane the black art is again used to conceal Méliès’s head, when he has to remove it, via a covering against the background, together with a fake head, and when the body of Méliès has to be concealed as he performs as each of the disordered and disconnected heads. This second stage was produced by shooting the scene against a totally blacked out set, with Méliès’s body being concealed behind a black hoarding, composed to appear in line with the table tops shot in the first pass. Méliès would then shoot each of his head performances, timed to coincide exactly with each heads arrival, starting and stopping the film at the correct spot in order to make his sudden appearance at exit.
In many respects this expansion draws upon aspects of the roller coaster and other events that made use of wheeled carriages, which produced actual sensation of movement within the real world. Raymond Fielding outlines the founding conceits and ultimate construction of the Hale’s Tour, and denotes the ways in which it drew upon both early cinema and existent forms of transportation to create a virtual, yet also real, experience: what Raymond Fielding deems an “ultrarealistic” experience ("Hale’s Tours" 34 – 47). Fielding relates Raoul Grimoin-Sanson’s Cineorama in Paris, which used a series of synchronised projectors to show a balloon flight in an all-enveloping 360-degree field of view that audiences viewed from a raised platform, and the similarly skewed Lumière Brothers’ Maréorama, may have convinced Hale to develop a system, which eventually appeared in 1904 ("Hale’s Tours" 36 – 37). Each of these earlier systems produced views that were not only interesting and novel – representing elements of the actual world on a similar level to the Lumiéres' actualities - they also added the greater feature of people’s capacity for visual perception, not merely limiting it to a small square screen straight ahead. This allowed audiences to believe they were watching something more than a filmed novelty. Through the all-enveloping state of presentation and documentary-style imagery, the Cineorama instilled a greater sense of realism, drawing on other sensory levels to expand the cinematic experience beyond the basic diegetic visual paradigm. Buying a system created by inventor William J. Keefe, Hale developed a cinematic ride that had its inauguration at the 1904 St. Louis Exposition (Fielding “Hale’s Tours” 38). The following year an updated version called the “Pleasure Railway” used footage photographed from a real train’s cowcatcher, with spectators seated in a mock-up carriage. A system of lugs beneath the car raised and lowered it as if running over actual rails, a rush of air and sporadically human-operated mechanical lurches, plus the apparently all enveloping filmed view of the train journey, brought spectators the undulating sensation of a train journey (Fielding “Hale’s Tours” 39). Fielding notes audiences saw locales from around the world, which were often shown via the early compositing technique of rear projection, and together with the mechanical systems the Tours produced a quasi--cinematic experience that suffused cinema’s documentary qualities with other realistic elements to create something ultrareal ("Hale’s Tours” 44).
Hale’s Tours points out a somewhat (for the time at least) unique and productive way of combining the technological basis of cinema and beyond – the creation of motion and other forms of virtual reality - with the visual invention of film – the use of photographic capture, and compositing - in an attempt at seamless integration. The connection of such matter allowed the audience to experience a play upon temporal and spatial elements, where they would be transported to different climbs and locations, and through the previously captured documentation, witnessing these spaces at distorted and different temporal perspectives. Gunning suggests that more than reassuring audiences, it simultaneously played them: “the audience is on a train”, but, “everyone knew they weren’t actually on a train” (“Unseen” 363). Yet, though a more tangible transformation of the space, the purer cinematic end result of Méliès’s productions, are arguably more productive endeavours.

In Mélomane we see the heads of the director turning left and right throughout their brief existence in the film, almost as if they are trying to wrestle free of gravity and escape from the framed space that seemingly holds them there, like some strange wingless birds, and the black art cements this idea. Though the space is necessarily black, creating a negative and invisible space that permits Méliès’s body and body parts to be hidden and masked, its swallowing up of light, depth and all ideas and notions of weight and understanding of perspective also permits the creation of fantastic freedom. Méliès’s extra heads become freed from his body moving through the air with a weight that, yes, respect the fact that they were props made of papier-mâché. But in the film’s diegetic world they would seem to belie the nominal weight of Méliès’s human head. Similarly his body continues to move about as normal, inhabiting a scene that is driven by an energy that is of a fantastic and illusionistic manner. Moreover, in Homme de têtes Méliès’s movement underneath the table that holds his first “extra” head, illustrates the film’s want to extricate itself from “rules” seen in real life, as well as toying with those of stage illusion, of which the film’s structure tacitly employs. By exploring the space beneath and showing that it is apparently empty Méliès tries to show (or at least conceal) that there is nobody hidden beneath, seeking to invisibilise both his trick and the fact of his using a form of invisibilisation to achieve it. This calls upon Pringle’s discussion of space within stage illusions – and tangentially cinema - where there’s “[a] willingness,
even longing, for space to play with us; to trick, tease and disturb us” (335), as well as an energisation of the diegetic space therein.

Not only is the space devoid of any observable elements pertaining to reality, save for the tables and chairs, which merely provide a point of lift-off for the heads but, like a blank slate, the negative blackness also permits the inclusion of any ideas a filmmaker and the subsequent watching spectators might wish to assimilate there. Though he must observe certain rules, these are essentially those constrained by the technological limits of the period. By retaining and making practical use of the invisible void behind the composited heads, Méliès usurps the invisible void, conceiving the possibility to see something more within the black invisible space used. In addition to imprinting numerous elements of both different scale and from different temporal zones to produce energetic anarchical forms, such as heads within *Homme de têtes, Mélomane*, and the moon-head of *Voyage dans la lune*, the director has also set audiences’ own meaning-making in motion. To wit, the film conceptualises something more than heads becoming free of Méliès’s corporeal form; we view a tantalising insight into a void beyond the realm of our reality, imprinting ideas and beliefs concerning motion, energy, flight, anarchy and so forth.

The black art technique used to create this invisible trick therefore does indeed hold the various heads and other objects, characters and elements in place, but in fluctuating and multiple ways. Indeed the very celluloid itself, with its coating of light-sensitive emulsion, finally transformed by the interaction of light against the silver halides, finally traps the imagery of the heads in the creation of a positive image. This positive image therefore holds meaning, both literally and symbolically; but it can be seen as a variable and temporary entrapment. The frames of the film, together with the ability of the audience to imprint a meaning upon the black, invisible vacuum that contains the heads of *Mélomane*, allows them to make liminal escape, within their imagination and indeed from their original form in the real world.

In this respect the film, like many of Méliès’s films, plays upon Bazin’s theory of ontology within the photographic image. At the outset of his article Bazin says “If the plastic arts were put under psychoanalysis, the practice of embalming the dead might turn out to be a fundamental factor in their creation” (“Ontology” 4). For Bazin this marks out
cinema as symbolically enshrining the physical body and surrounding analogous objects within a vault that allows them to be preserved, analogous to the Pharaohs of Egypt and subsequently French Kings such as Louis XIV, through painting (“Ontology” 5-6). Though cinema makes this more metaphorical – but serviceable – this theory arguably allows the photographic arts to perform a strict locking down of elements into a space that preserves; and therefore situates the elements in the space for time immemorial. Despite the chaotic motion and disruption occurring throughout these instances, and many more besides, through the precise techniques of photography and cinema Méliès is still able to hold the energy in check, and restrain the dislocation of time and space by the ultimate conjoining of the elements in the final print. Writing decades later Bazin surmises this aspect well, noting: “The photograph as such and the object in itself share a common being, after the fashion of a fingerprint. Wherefore, photography actually contributes something to the order of natural creation instead of providing a substitute for it” (“Ontology” 8). So, though Méliès’s films constantly play with the concepts of time and space, flexing physical and chronological aspects via the implementation of various additions themselves already broken up by concealed and fractured performances, the black art also meshes various elements together, uniting and instilling a sense of solidification and location.

Tom Gunning’s discussion of Méliès’s use of editing illustrates this final point well. Gunning notes that until relatively recently the practices of editing were overlooked by those studying Méliès’s work, but in “Primitive Cinema, A Frame-up? Or the Trick’s on Us”, Gunning begins to highlight its importance. Gunning situates Méliès as, if not the “father of montage” (Gunning 98), then certainly a director developing skills seen in much later films using continuity based editing. By careful implementation in pausing and re-starting the camera, combined with the black art, Méliès invisibly combined a series of separately shot pieces of film into one continuous diegetic structure, using the substitution splices. These edits Gunning states, are “nearly literally invisible”, and produce a unicity, a continuous and uniform point of view (Ibid.). It is through this consistent unicity, provided by the already noted invisible processes of black art and the “invisible” editing that brings my discussion full circle. Although Méliès produces numerous atemporal elements and creates empty voids, he ultimately assembles them into
one unbroken spatial and temporal whole. Despite spectators witnessing numerous radical moments, their final realisations are viewed through their composition within the frame of the film and that of the screen. Gunning notes that Méliès’s specific filmmaking style, in which he uses single viewpoints rather than articulating his story through variable shots ("Primitive" 99), denotes his background as an illusionist. Here was a practitioner who approached the audience with the intention of distracting their attention from the mechanism of his illusion. However, this “display of showing, of showmanship”, or “Monstration” (Ibid.), as Gunning describes Méliès’s work, involved a complex methodology. Although Méliès successfully achieved unicity, it is ultimately merely an illusion – a projection of skill that is held together by the schemes of invisibility I have outlined.

But it is important to note that, though Gunning posits this as an illusion of actual unison, the films which use the black art on individual moments or at greater length in a film’s duration, do ultimately produce a cohesive whole to the audience. It is a factor that strikes a chord in both further examinations by other theorists and, as shall be noted, in later films. Elizabeth Ezra, in her book on Méliès, The Birth of the Auteur (2000), builds upon this idea by highlighting how the director manages to effectively transpose the complexities of various editing principles within single shot films or individual shots within multi-shot productions. Ezra’s theorisation, based upon le grande syntagmatique du film narratif (1966), Christian Metz’s system which breaks films down into discrete units in order to explore the creation of narrative, looks to position similar ideas surrounding narrative units but within a single shot. Ezra believes that, despite Metz’s beliefs surrounding the lack of narrative within films prior to D.W. Griffith, the creation of narrative syntax did not have to merge with film, because it was already present (Ezra 35). She goes on to illustrate how aspects of editing and the intricate structures of representation that produce narration and the coherence of story seen within later films are very much in evidence within supposedly primitive productions. Aspects such as inserts (Ezra 36 – 40), cross-cutting (described as parallel syntagma (Ibid. 40 – 43)), and the replication of action in order to produce emphatic connections to audiences (described as bracket syntagma (Ibid. 43 – 44)), are all used to produce a complexity of narrative moments, located about the black art, substitution splices and other means to unify
elements in one shot. Ezra notes for example that Méliès inserts a narrative element into
the frame by overlaying a second image, such as the heads in Méromane, over the
concealing/invisible black backing, which emphasises our attention in a similar way to
filmmakers’ later insertion of close-ups. These paradigmatic examples, as Ezra calls
them, founded upon the use of the black art in order to execute them, are “at once self-
contained […] and part of the larger scene” (36) and demonstrate that Méliès was a keen
user of essential practices of control, order and narrative, as well as a wildly inventive
purveyor of chaos, radical invention and illusion.

Such ideas ultimately show that by using the concepts of invisibility made
available through the black art, Méliès’s films work to dislocate a considerable number of
factors within their duration, moving to rupture elements of time and space, shape and
weight, both on-screen and off. In actually creating the imagery for his films as well as
their ultimate reception by audiences, numerous moments continually evoke such ideas,
causing us as viewers and scholars to reconsider what we are seeing and how it was
placed there. By cloaking his form and concealing and revealing elements, Méliès
constantly plays with invisibility to push time and space in radical new ways, making
absence present and vice versa. But in addition Méliès also uses invisibility to provide us
with a cohesive finality to the journey we make into the dark black surrounds used in his
on-screen worlds. Using aspects of editing practices in unison with mise-en-scène as
delineated by Gunning and Ezra, we can see Méliès consistently regrouping his chaotic
and fractured form, ultimately creating a cohesive narrative. Indeed we are viewing a
narrative of images, pulled out of one area of assured meaning, distressed and splintered,
before being housed in a new unified space. Though to begin with we are not entirely
quite sure of what we are perceiving we begin to augment what we do perceive and adjust
our senses to create something interesting and innovative. We recognise something, a
film’s title, an object, or objects within; and those wild and chaotic objects that we do not
at first primarily distinguish, we begin to adjust to and hypothesise answers from. For we
know it is only an illusion, a short step will take us away from the screen world. We step
into a cinematic blackness and are immediately transported somewhere else, but though
initially anxious and unsure of what we are seeing, we ultimately project something new
and engaging upon the black space therein, and invisibility allows this to occur.
Entering the “World of Tomorrow”.

The establishment of Méliès’s techniques, their ability to transport us into new areas of temporal and spatial sense, and simultaneous combination of such constituents, continues in a raft of techniques that takes us up to recent films. Following Méliès own work using the cinematicised black art, Frank Williams developed the Williams process (also known as the black-backing travelling matte process), which used similar techniques. Here, objects and elements were again photographed against a black background, but the complete separation of foreground and background photographic elements allowed better quality results and more flexibility. Whilst results were visually similar to Méliès’s work, the later process produced a sense of greater solidity to the compositied imagery, rather than the ghost-like, washed out quality of Méliès due to the separation of elements and film. In addition, background photography wasn’t limited to a studio, but could be extended to exteriors as well. It is perhaps most famously used for James Whale’s *Invisible Man*, which allowed similar results to Méliès work, producing the visualisation of invisible body parts and full torsos, but also allowed numerous films to take advantage of creating locations and dramatic moments which arranged disparate spaces and time zones together. These included Sam Wood’s 1922 production *Beyond the Rocks*, featuring Rudolph Valentino rescuing Gloria Swanson from a mountaintop. 1932’s *Most Dangerous Game* (Directors: Irving Pichel and Ernest B. Schoedsack) also keenly exploits the ability to assemble footage of waterfalls photographed at another location and time to that of the stages used for the majority of the chase by the filmmakers (Fig.

\[12\] The first shot of the foreground element was duplicated and a high-contrast copy was created where the black areas were developed to create a precise transparent surround. The still present foreground element would appear as a precise black solid matte, essentially a cut-out, which could then be sandwiched through bi-packing with background photography and then contact printed to create an opposite matte of the foreground element, a transparent un-exposed hole surrounded by its background. This unexposed piece of film was then bi-packed again with the original foreground element and re-exposed to light. This allowed the opposite mattes of foreground and background shots to precisely match up (see Rickitt 58).
2.3), and even more so with the use of scaled-up model footage.

Composited into backgrounds featuring actors Joel McCrea and Fay Wray, these scenes illustrate one of the many types of compositing that would follow from the black art. Each one would essentially use the same technique, where analogous colours would be used to make invisible certain portions of an object or the surrounding space and then position a new surrounding element through reversing the process. Some, such as *The Most Dangerous Game* and *King Kong*, used rear projection where live action was combined with further live action or model sets to create a unified whole out of disparate pieces. Other key types included the “Dunning-Pomeroy self-matting process” in the 1920s for black and white film (Rickitt 60; Brosnan 39), the 1930s “blue screen separation” technique (Rickitt 60 – 61; Brosnan 110 – 111), and the “sodium vapour process” that appeared in the 1950s (Brosnan 111 – 112; Rickitt 6). Each version used a similar mixture of uniform coloured backgrounds against which actors and objects were photographed (ranging from blue for the first two techniques to yellow for the last) and a series of either bi-packed film negatives (blue screen separation), or in camera combination (Dunning-Pomeroy and sodium vapour). All produced relatively good
results, despite matte-lines being evident in certain shots, and each had positive and negative attributes. The positive ranged from the flexibility of Dunning–Pomeroy and the vapour processes, which allowed their relatively easy combination with background elements through bi-packing or optical printing, with the vapour process also removing almost all matte-lines. However, both this and the blue separation process needed complex equipment, and this first blue screen technique suffered from a noticeable blue fringe effect when the image included fine hair and/or smoke. Transparent objects within the frame – such as water – also couldn’t be photographed\textsuperscript{13}, since they became invisible.

Only with the arrival of the “blue screen colour difference process”, which again used a blue background and a series of duplicate copies of the initial shot that contained the actor or object, was the technique improved enough to provide truly flexible results. Richard Rickitt notes:

A system of producing travelling mattes was sought that combined the quality of the dual-film sodium vapour technique with the convenience of the blue-screen colour separation process, which derived its mattes from a single negative shot in a standard production camera. (64)\textsuperscript{14}

Using this process, filmmakers were finally able to execute the imposition of separate elements into a film’s body, using techniques and technologies that both solidified the combination of temporal and spatial parts, and to do so with a subtlety previously impossible. Films could combine disparately shot elements – models of spacecraft, monsters from a mythologised past, or merely buildings – drawing together what was photographed at different periods during production. One relatively simple example would be the Gozer temple in Ivan Reitman’s Ghostbusters (1984), which used an extensive matte painting to adapt an actual New York City building into the film’s temple. As Figure 2.4 shows, the matte painting included a cut out (matte) space into which live action photography could be combined. The shot used both this internal

\textsuperscript{13} Save for the Sodium process.
\textsuperscript{14} See also “Traveling matte shot” at intralinea.it.
extension with a further wider extension of the surrounding city environment to create a completed shot that used several temporally and spatially distinct elements as one.

Though *Ghostbusters*’ use of the matte painting in this instance used a simplistic rear-projection, the fundamentals of the practice can also be seen in all other iterations of the technique, including those of blue and green screen technologies. It was a process, Thomas G. Smith says, where “the principle was essentially one of creating silhouettes using the special blue light coming from the blue [or green] screen” (182). Smith cites its use in creating the speeder-bike chase in *Return of the Jedi* (1983), where plate footage from California’s Redwood forest, shot at a slow frame rate, was combined with photography of Carrie Fisher as Leia on a model speeder-bike against a blue screen (Fig. 2.5).
Their combination, using mattes created via the method outlined above, created the final visual of the character and vehicle flying through a landscape and, thanks to the originally slow cranked footage of 3/4 frames per second (fps) now running at 24 fps, at greatly accelerated speed (see Brown “Steadicam Plates”). The technique, with its combination of elements and their insertion into the void of the blue screen, closely follows the essence of Méliès’s work and indeed the essence of the issues discussed earlier in the chapter compositing spatial and temporal events to transform the screen space.

Drawing them together through the blue screen process and compositing allowed the formation of an entirely new temporal and spatial zone, which once again transforms the individual spaces of each and transforming them with an energy, akin to Gunning’s previously stated theorisation of unseen energy. The area used once again acts as a repository that held multiple “reprintings”, the energy of which transforms the space in new ways. By using the technique to harness separately captured images to a scene that involves fast motion, vehicles and travel, the Speeder-Bike scene produces an energised sensation. Suzanne Richard compliments this notion, saying: “Méliès’s films are constellations of artifice, deception, illusion, resemblance, metaphor and enchantment; they have the metonymic character of a chameleon opus” (49). These words highlight how Méliès usurps the immovable artifice of his stage-bound films and transports them (and us) into worlds located in other areas and times, using parts gathered from elsewhere to form a new whole. In Méliès’s works we might see Lilliput as a landscape and people created through a series of individual elements – models, backdrops and actors – designed and photographed to give the effect of miniaturised scale against another actor shot in full scale. The speeder-bike scene similarly used the same techniques – using different photographic speed, the location and other elements – matching them together to create the planet, the sense of speed and the vehicle. The notion that such techniques can – in Gunning’s words – reconstitute and transform space, is something others have managed to adopt and employ. By combining elements captured elsewhere at other times with what was a practically motionless actor and object on a blank stage, the Speeder-Bike scene reveals new images that unleash Gunning’s sense of energy within the screen, taking us to new spatial and temporal places. Combining a series of disparate parts, the
scene replaces previously invisible, absent and inactive spaces with new visible and present images that are now energetically vitalised.

Rather than merely using the technique to combine one or two elements into a new zone the most recent digital iteration of the black art allows the production of vast settings and worlds and allows further considerable flexibility to how time and space can be used than was previously available. The digital exploitation of the blue screen/green screen process removes previously inherent problems surrounding the quality of fusing multiple elements together. Whilst the optical printer was a significant aid in the creation of compositing, precisely holding together pieces of film in order to match matte lines and piece together multiple photographic elements, using duplicated film elements (known as “dupes”) led to problems of multiplied grain. This caused the illusion of seamlessness to be broken down, or at least questioned by spectators, because of the difference in quality between foreground and background elements. More simply, the process is analogous to photocopying an image from a magazine and then photocopying that copy. The resultant images lead to a noticeable drop in fidelity or resolution from the first image to the last. Filmmakers could manoeuvre around this drawback by using large format film stock, including VistaVision. The VistaVision format, adapted by the VFX department during Star Wars’ production meant more detail was packed into the frame area compared to the standard 35mm film gauge, due to it being run sideways, offering a greater area of emulsion (Figure 2.6).

As a consequence the duplication process meant much less noticeable difference in quality when producing the final release print. But with digital compositing, as long as the encoding of the data is kept high, the final
image is seamlessly integrated.

Lev Manovich discusses digital compositing in *The Language of New Media*, noting:

[W]hat before was a rather special operation now became a norm for creating moving imagery. Digital compositing also greatly expanded the range of this technique, allowing it to control the transparency of individual layers and to combine potentially unlimited number of layers. (“Language” 132)

Previously the mechanics of photographic technology (the optical printer and film stock) might have limited the number of layers placed into a final shot; digital media allowed much more complex shots to be constructed without qualitative loss. Examining Méliès’s films it is possible to see the depreciation of quality, in for example the hazy and transparent nature of certain portions of figures and objects. Watching Méliès’s multiplied heads in *Le Mélomane*, it is possible to see the horizontal lines of the musical score that should run behind Méliès’s heads partially running over or at least through them (Figure 2.7).

As noted, though optical compositing together with matte work managed to fix many of these problems, there was a limit to the numbers of layers that could be assembled before the grain of film stock began to obscure the shot’s contents due to the “noise” of so many duplicated elements. Gunning theorises that Méliès’s work features a series of framed spaces “defined as a surface bearing the imprint of several images that create an ambiguous area of often contradictory orientations”, and where the previously separate images energise the previously empty space (“Unseen” 358). But, though the frame acts
as a repository, the sheer number of images contained within the frame is qualitatively compromised. Méliès’s own work – which was essentially based on a printing press methodology (as Gunning notes in “Unseen” 359) - could only contain so much on a single of piece of film. But even more recent optical techniques that used elements contained on separate pieces of film and combined via the optical printer, such as the efficient “Quad” (Rickitt 78), can only support so much. The physical grain of the film meant temporal and spatial movement and the contained energy within were hindered. Now digital techniques allowed more substantial levels of compositing, leading to a theoretical limitlessness. As Manovich observes, the “special” now became the norm, at least in practical application. But though technically easier, its usage still retains a distinctive power for creating imagery that unleashes possibilities to more fully travel to temporal and spatial zones that recall and expand upon Méliès work.

Manovich goes on to denote the practice of digital compositing is based upon coordination and adjustment (Ibid.), where the elements are selected and composited, but not necessarily in that order. Instead of selecting said elements and then compositing them together, a technique which would follow previous analogue procedures, the elements could consistently - and most often are - worked and re-worked. Between 2001 and 2010 a series of films began to utilise techniques that followed this precedence, using vast blue and green screen stages for their principal photography, which then replaced the stages with digitally produced backdrops and other objects. These films - Vidocq (Pitof 2001), Immortel /Immortal (Enki Bilal 2001), Casshern (Kazuaki Kiriya 2004), Sky Captain and the World of Tomorrow, Sin City (Robert Rodriguez 2005) and 300 (Zack Snyder 2006) - made use of human actors, but the surrounding world and other mise-en-scène, was mostly built out of CGI. Each saw their makers working to incorporate an inordinate number of digital elements into the frame, inserting them on to both blank backgrounds, as well as basic mock-ups of vehicles and other stages – building layers on top of one another without evident loss of quality. Such films use techniques that firstly play upon Méliès’s use of the black art, using the stages as empty, invisible voids, into which a number of new elements can be placed producing new spatial paradigms. But the films’ use of very recent digital technology is combined with a series of settings, characters and sensibilities that revolve around past events and times. The creation of
such worlds and how they are orchestrated, emphasises how invisibility manages to play with and fuse together pieces of space and time with thought-provoking results. Conran’s *Sky Captain and the World of Tomorrow* (2004), a film which uses blue screen to composite together the vast majority of its environments and other pieces of *mise-en-scène*, ably demonstrates this.

Set in the late 1930s, *Sky Captain* follows Jude Law’s Joseph “Joe” Sullivan, an adventurous pilot in a pulp-science-fiction world who becomes embroiled in the abduction of several scientists by the mysterious Dr. Totenkopf. Accompanied by reporter and ex-girlfriend Polly Perkins, he travels from New York through various spectacular locales and settings, encountering giant robots, creatures and other strange and marvellous sights. Production of the film, an extension of a short Conran produced over a period of four years (Probst “A Retro Future” 1), made great use of blue screens and some basic props during production, before lengthy post-production incorporated digital images to build the film’s finished environment. Though the end result appears to be a seamless whole, similar to films using solid sets and locations filmed in situ, the film’s creation was far more removed from such a basis.

Conran’s film features a stylised approach to its photography, in part due to its period setting, which gives the film a soft gauzy look that is similar to certain films shot in the late 1930s, such as Sternberg’s *Shanghai Express* (compare Figures 2.8 and 2.9).
In certain respects this can be read as both revealing and concealing the artifice of the film’s creative techniques. Certainly it highlights that this film is trying to place itself in a past temporal zone, using a photographic style and narrative tenets of film and media from the aforesaid 1930s, such as pulp stories, film serials and the classical Hollywood studio style. Though produced in the mid 2000s, *Sky Captain*’s numerous cliff-hanger moments (such as the heroes’ death defying plunges into an ocean and close escapes from explosions), plus the soft-focus visuals coupled to costumes and period setting marks Conran’s film as a re-envisioning of the 1930s cinematic style. As Christopher Probst affirms:

In creating the look of Sky Captain, the filmmakers referenced Mark A. Vieira’s black-and-white photography book *Sin in Soft Focus*, the films of F.W. Murnau and the noir classic *The Third Man*, as well as a number of 3-strip and 2-strip Technicolor pictures. ‘Sky Captain borrows its visual sense from the Thirties and Forties filmmaking style — we strove to maintain that pieced-together feeling,’ says Conran. (3)
Beyond the more obvious evocation of early photographic style this approach also echoes the ideas observed in Méliès work, where he took a series of elements from extraneous temporal and spatial areas, before piecing them together to create a seemingly unbroken whole. As with Mélomane, and Le Voyage dans la lune, Sky Captain creates a world that plays with the physically concrete and temporal locations, drawing together the unrelated and disconnected to create the related and connected.

So when we view Polly Perkins entering Radio City Music Hall (RCMH) of 1939 (Figure 2.10), we see shots that seemingly mimic the concrete studio style of 1930s filmmaking using sets or locations. But simultaneously we are witnessing the end result of images that began with a blue screen set consisting only of the physically existent Paltrow and occasionally other key actors.

Conran’s note of “that pieced together feeling”, naturally evokes the use of compositing. But Conran’s approach is open to interpretation, since he may mean the film follows the introduction of continuity editing in the late 1920s, where establishing shots, close-ups and cut-ins were developed (see Bordwell, Staiger and Thompson 194 – 213). These multiple shots began to be used over singular tableau shots in order to propel the viewer through a scene that might move from space to space, and indeed time, rather than staying in a single room. Orientation within the scene might involve editing the motion of a character from shot to shot by following their direction, or through matching
a character’s gaze to a close-up (Bordwell, Staiger and Thompson 203). Certainly the film follows the continuity editing style, where we follow establishing shots into the location with a series of related cuts, and a shot-reverse-shot paradigm. In the RCMH scene we see Polly walking across the lobby by an observer who stands just in shot on a balcony above. We cut back to Polly on the lower level who hears something and looks up. We then cut to her looking up to the balcony and see the person move through a doorway. Polly moves forward and we cut to a hallway, seeing the observer entering the auditorium as Polly enters the shot. By using this style of editing we are able to follow the flow of characters’ movements, their points of view and fluently track the narrative action. But, significantly, the compositing of digitally produced shots – particularly those establishing a past era - also allows a persuasive illusion of (and play upon) consistency and co-existence of time and space akin to continuity editing.

The film also follows other 1930/40s films such as *Citizen Kane* (Orson Welles 1941), which used a combination of deep-focused compositions and editing, retaining a sense of the tableau style so often seen within Méliès work; and as chapter two notes, the development of certain shots depended upon the compositing of separate elements to create the illusion of their unity. So, though the film appeared to be a concrete experience – made up of real stages and locations, the VFX artists often actually fused together models, paintings and other elements to create the film’s final shots. It was a feature seen repeatedly throughout other films, allowing the insertion of elements into a shot too expensive or dangerous to complete, including the leopard in Howard Hawks’s *Bringing up Baby* (1938), and/or complex shots, such as the electrocution of the alien from *The Thing From Another World*. These examples, and *Sky Captain* itself, show that the consequence of terms such as “piecing together” carry different connotations and often use invisibilisation to make the totality metaphorically concrete. But in this case, as with Méliès’s work, there is arguably a greater use of elements that are only partially physically present – if physically existent at all – where the elements are not concrete and actually tangible (as with sets and exterior locations).

Rather than relying on models or paintings, the elements of *Sky Captain* are organised digitally, either through photographs which are scanned and manipulated or wholly digital landscapes and objects. This takes such images beyond Méliès’s
composited images – which were still ontologically present in the form of duplicated celluloid images, reflecting Bazin’s ideas surrounding realism and existing before the camera. As with Mélomane, we are seeing a transformation of the screen’s spatial parameters. But rather than relying on physically present objects which are copied and transformed by the “unseen energy” of the camera, the dimensions of space and time are joined by non-physical elements and all are further transformed by digital technology, whose domain is virtual and technically never seen. As Manovich’s statement above notes, there is a potential for unlimited layers to be drafted into the cinematic frame by this modern technique, making the most recent developments in compositing a repository for possibly infinite numbers of transformations and incorporations of new elements. Arguably the glowing, soft-focus-like imagery that supports Sky Captain’s plot, and often propels it, allows the filmmakers to place CG elements into the film without necessarily worrying about audiences noticing the rather soft look of vehicles, streets, flora and fauna. Though CG can be often conspicuous by its shininess – as can be seen in the early example of the “Genesis Effect” from Nicholas Meyer’s Star Trek II – the Wrath of Khan (1982) – VFX artists continually strive to add texture and other atmospheric characteristics to CGI in order to make them appear more real, naturalistic or at least to contextually fit the film’s live-action environment. Even the alien Na’vi from James Cameron’s Avatar (2009) a film that exists extensively within an entirely digitally fabricated world, features greater attention to skin texture and reflective lighting (Figure 2.11). In association with the mocap technology used to create its movement, the CGI character is given a more satisfying detailed and realistic look that contextually fits with the director’s intention to create a realistic looking alien environment and characters. As Duncan says: “[It was] Jim Cameron’s mandate that there should be nothing in the Na’vi virtual world that could not
be built in the real one” (“Seduction” 107). But though this statement related to props, the flora, fauna and atmospherics were similarly driven, as senior effects supervisor Joe Letteri said “The goal of everyone over the years has been to make these shots look real [but moreover] we decided to bite the bullet and make them real” (qtd. in Duncan “Seduction” 128).

Due to the period placement of *Sky Captain* then, the film’s visuals can be argued to reflect the time of its setting, and therefore any softness to the image can be viewed as a stylistic choice that captures the filmmakers’ intentions. Audience awareness of the film’s production during 2002 makes its position as a modern-day film quite clear. Yet the use of antecedent elements to create the film marks it as a production whose temporal position is in a state of flux rather than stability. As cinematographer Eric Adkins notes during the development of Conran’s film “They created hundreds of backgrounds that were comprised of archival photographs, matte paintings and animated CG environments. Slowly, layer upon layer, they built the look of the project” (Probst 1). Unseen energy is still palpable, but the invisibilisation that is used to conceal certain aspects of time, space, and physical objects is both taken further and moreover reorganised. It more auspiciously produces Gunning’s unicity, but simultaneously the images created conspicuously lie between otherwise defined areas without belonging to either of them. Calling upon digital compositing and digitally created visuals, *Sky Captain* can create a world that readily expands and refines Gunning’s reading of Méliès’s films by building new spaces, temporal zones and apparent (but virtual) physical articles and items. So for example, when Polly and Joe arrive on Totenkopf’s jungle island the vast majority of the jungle is contained within files that are made up of digital data. Though certain physical props (most especially fake trees and plants) were laid into the shot to allow a greater level of interaction for the actors, the vast majority of the scenes’ backgrounds were added later.

The flexibility and skill of digital compositing and the importation of such VFX potentially allows a more refined and expansive development of Méliès’s work, which Gunning reads as restructuring and energising the frame, and yet ultimately produces a cohesive whole. Manovich highlights the inherent powers available within the modern technique, revealing: “Once an object is partially assembled, new elements may need to be added; existing elements may need to be re-worked” (“Language” 132). Consequently
building up the layers of the jungle scene, or indeed the vast majority of the film, meant that the filmmakers were readily able to bring further objects from locations greatly distant from the original production into the “soundstage area” and into the final frame.

Indeed, *Sky Captain*’s world is mostly dependent on this procedure. In requiring a considerable number of locations for its action, creatures and robots to battle, vehicles to journey with and at one point, a villain to face off against, Conran builds an expansive film on a microcosmic scale. Though scenes range from relatively claustrophobic settings, such as narrow New York Streets and a cramped scientist’s lab, to wide Nepalese mountain ranges and cavernous rocket launch sites, the soundstages used were at best only 135’ long by 116’ wide, and 50’ tall, which were then split into three separate areas (see Probst “A Retro”).

The set’s usage and the layers of images ultimately placed over the blue screens both acts as a spatial and temporal pattern, with the locations not merely being recreated through sets that fabricate the 1930s, and the filmmaking style, but also photographs from the 1930s. As a consequence the film is a shifting paradox of temporal zones. It is at first a recreation of the past that, through the photographic images used, exists as a captured representation of the past, analogous to and even demonstrative of the 1930s films and period. Unlike the use of sets that might be built to recreate a period setting, the locations, environments and craft created for the film were mainly based on elements that had little physical basis. The photographs were perhaps the most substantial pieces used, but even their basis is one built out of a thin, partially transparent material, celluloid film, whose existence and temporality are always under threat (see Paolo Cherchi Usai’s “The Death of Cinema”; “Burning Passions”). But simultaneously the imposition of Jude Law, Gwyneth Paltrow and other currently living actors, together with the inordinate level of technology used to create the soft-lit and stylised visuals, and the extensive number of composited layers, gives the film a modern point of reference. The unicity achieved by compositing is further complicated and manipulated by the introduction of Totenkopf, a villain manufactured through importing imagery and footage of the late Laurence Olivier. Though brief – and designed to show Olivier playing a character rather than representing himself – the use of photographs and footage from a documentary to create the
mysterious villain of the film once again highlights a shifting temporal plane for the film’s creation and operation. Inserting the digitised footage of Olivier’s visage into the surrounding digital façade of Totenkopf’s lair is another layer arranged within the frame that (in Figure 2.12) includes the minor physical presence of Law as Sky Captain. As with Méliès’s work, where that director would insert his head and body parts into the frame through substitution splices and double exposure, Conran’s film similarly inserts Olivier’s head into the frame, drawing its form out of a separate temporal area and combining with others to produce a unified state. However, the creation of the character was formed through footage and images that were themselves existent in other temporal and spatial zones. Though, like Méliès’s multiplied heads in Mélome, Olivier is essentially “stamped” into the frame following the creation of the background, Olivier’s brief “performance” was taken from secondary documentary footage of the actor at a fundraiser. VFX supervisor Darin Hollings and Conran decided on using a holographic-style for the villain’s sole appearance, adding “scan” lines to give the imagery a stuttering, early TV-like broadcast effect, which also continued the film’s referencing of Fleming’s Wizard of Oz (1939)\(^{15}\). Matched to a 3D model of the actor’s head, the “glitchy monitor effect” of the film footage was synchronised to frames of Olivier’s mouth that the editor had dissected, before compositing the finished footage into the scene (see B. Cook “Macs help”). The composition of elements from different temporal zones allowed the film to present a performance that reflects Méliès’s aesthetics, whilst convening more modern-day digital techniques to create a character that acquires a

\(^{15}\) For example the inclusion of Oz footage in the RCMH scene, as well as the journey to otherworldly locations, and the use of Technicolor styled colour for sequences outside of the sepia-hued Manhattan.
fluctuating temporal and spatial cohesion. It is an effect enhanced by the holographic style, where the briefness of the footage used to create Totenkopf’s image is eliminated by a certain level of visual and audio asynchronicity. The stuttering face, with its ebb and flow of appearance and audibility, has a shifting resonance that depends upon an updated version of the black art technique that simultaneously invisibilises the now absent past, the surrounding bluescreen and the intermediate steps to its final result, energetically convening the past into a new present of synchronous continuity.

Collapsing/expanding digital space.

The fact that Totenkopf exists in a different environment to both the final film, to the period of the footage’s creation, and indeed the actor’s own existence intensifies the distance of its ultimate situation. By revealing this layer of the character, albeit briefly, the extent of invisibilisation as a means of creating unicity is a frenzy of energy that simultaneously collapses and expands time. This is continued throughout the building of the film’s world and an aspect that returns us to Trish Pringle’s exploration of stage illusion conventions. In watching Sky Captain, Pringle’s suggestions are again conveyed through the creation of the film’s architecture and allied diegetic elements.

As previously noted Pringle highlights stage illusion’s aesthetic practices change our discernment of an illusion’s spatial parameters, which leads to her suggesting an updated use within architecture where we enjoy an interplay with space. When Sky Captain presents its various locations, from New York’s Manhattan, through various cloud-soaked skies and undersea chasms, to Nepal and Totenkopf’s island lair, we are mostly witnessing digitally built locations. Actual props and environments were consistently scarce – Sky Captain’s plane was physically made up of only the cockpit and half a wing and the lobby of Polly’s Chronicle newspaper headquarters was mainly built out of photographic stills (Fordham “Brave” 31). By using succinct elements the designers, animators and compositors would not only transport viewers to these locations within the 1930s, but would also more importantly build the settings on both a lower budget and with more flexibility. Though planned well in advance through storyboards and 3D animatic reels (basic video mock-ups of scenes that showed the layout and timing
for cinematographers, editors and actors (see Fordham “Brave” 19)), the filmmakers were able to create a film that cost much less than if shot on far-flung locations dressed for the period. But it is the capacity to create a virtual world that – where necessary - expands and collapses, that both reflects Pringle’s writing on architecture and extends Méliès’s working practices.

One such idea focussed on by Pringle includes the creation of space through mirrors, an area already mentioned earlier in this chapter. Pringle says “The mirrors were able to take a piece of space from one part of the stage and make it appear to be somewhere else” (338). Though the black art, and indeed bluescreen techniques, delimited the necessity of the bulky and inflexible glass of mirrors with all-enveloping black cloth and even more streamlined cinematic optical techniques, the concept of making space from one location appear in another continues. Considering Sky Captain’s techniques as an electronic mirror, it is possible to see the blue screen system and digital compositing as reflecting and therefore interposing an object and/or vista from a digital file (point a) to the film’s frame (point b). Consequently the digital techniques used are but an updated version of a conjurer’s table, and the optical tricks used by Maskelyne, Morritt and Devant. As with earlier stage illusions, which relied upon only showing you certain elements, and obscuring others, the technical practices similarly only allow audiences to see what it is the filmmakers want them to. Though editing and indeed camera position would essentially create this paradigm as well, digital compositing, which removes the original bluescreen and replaces it with something new, is arguably far more closely associated with the illusionistic practices. Because, rather than changing the camera position or making an edit between two separate shots, Sky Captain uses the same originally captured scenes and then uses compositing techniques to hide what you see – relying on the inserted digital composite to create a sightline that obscures what was actually present.

One sequence for example, where Polly and Sky Captain track a radio transmission that emanates from the midst of a Nepalese mountain range, featured extensive use of digital matte paintings, the addition of the remaining parts of the aeroplane as a CGI model, and even the insertion of digital footprints in the snow of wide shots (Fordham “Brave” 30). Though certain practical elements were still used, such as
fake snow that could show footprints for closer shots, the majority of the environment was produced by invisibilising the blue screen stage that Law, Paltrow et al walked on and replacing it with digital facades. As with Méliès’s techniques, where the blacked out stages of the director’s studio would see certain parts fitted with practical sets together with the post-production insertion of separately created elements, Conran follows suit. Additionally however the digital techniques often allowed substantially greater spaces to be housed. Though Méliès also produced wide spaces, including the infinite blackness of space in films such as Le Voyage dans la Lune and L’éclipse du soleil en pleine lune/The Eclipse: Courtship of the Sun and Moon (1907), Conran manages to produce scenes that do not have to rely on the locale being almost purely black to produce the deception. Instead, Conran’s film’s extensive vistas introduce greater dimensionality through the placement of different image layers and atmospheric effects (clouds and snow) that give animation and depth, and greater spatial presence. Together with movement of both characters and the camera itself through the set, plus colour, stylised texture and three-dimensional lighting, Conran extends the possibilities of Méliès’s procedures and Pringle’s ideas surrounding the creation and longing to enter and vicariously play in a space where there is apparently little or none.

Pringle goes beyond merely discussing the practices employed by magicians and illusionists in a functional sense, and begins to explore how such elements reflected the rise in the cultural morals of the period. She outlines a rise in phobias surrounding dark spaces being able to conceal persons that may affect them that is situated around “evidence of a collective spatial dream [and] a desire and ability to play with spatial concepts” (Pringle 340). The writer goes on to note that the sensed “horror of emptiness” led to excessive ornamentation, where designs of wallpapers, and the inside receptacles, drawers and other “multifunctional furniture” were explicitly built as an expression and need that the public felt for dealing with this new “heightened consciousness” of spaces, and what might lay within (Ibid.). Such aptitudes during the late-nineteenth century gave rise to a vivacious want to both enter into the aura of these new spatial dimensions and to partake of symbolism therein and, in Pringle’s view, that this offers an attractive site for entertainment such as magical illusions. By entering into the province of magic and illusions, the Victorian populace could explore and confront these fears.
Pringle continues, noting that though the public had such fears they were also entering into a spirited consensus of sitting in the dark, frequenting the dimmed lighting of an auditorium to see such delights as Maskelyne’s *The Will, the Witch and the Watchman*, (339) and *Pepper’s Ghost* (341), which used mirrors and glass to conceal and reveal performers. Within such shows, and soon after within Méliès’s productions, spectators could follow and wonder at the disappearance of the illusionist and other performers inside apparently impossible spaces; moreover, they could read about how the effects were achieved. Noting Albert Hopkins’ *Magic: Stage Illusions, Special Effects and Trick Photography* (1976), Pringle highlights the volume’s illustrations showing impossible views created a “frisson” (341, emphasis in original text). This condition was generated by the book’s ability to show viewpoints that freed the eye, allowing spectators to be in “multiple spaces at once” and “of seeing in many different ways at one time” (Ibid.), an idea that spectators could then engage in whilst watching the various tricks. In *Sky Captain*, audiences can also share this vicarious pleasure, by entering a world that extends the scope of the frame. As Kevin Grey states at the HTF thread on *Sky Captain*:

I was really unprepared for all of the new locations and visuals in the second half of the film […] I'm really, really surprised at the excellence of the integration of the actors and backgrounds. I thought it was very seamless and they felt more "connected" to the environment. (“Official SKY CAPTAIN”)

His and others on the thread (along with critics Jensen (“Rhapsody”, Hodgman (“Mr. Invisible”), and Ebert (“Sky Captain”) highlight the ability of the film to offer expansive worlds, creating a concoction of space and time.

Of course this idea of expanding the confines of the cinematic frame is featured throughout cinema, particularly as productions began to instil longer form narratives over trick films and shorter productions. Barry Salt writes of the changes beginning around 1900, before which scenes were seldom divided up into a number of shots, with George Albert Smith’s *Grandma’s Reading Glass* (1900) using point-of-view shots to gain closer attention to a girl’s views through her magnifying glass (36). Though a microscopic viewpoint, even this instance shows that the frame could produce the illusion of enlarging
aspects of what was being shot, and in doing so create a gateway where the physical space of the screen within the auditorium was expanded. This allowed perspectives and views into other spaces elsewhere, obviously at different times and of varying sizes. Yet it was an idea that was also present within the Lumière brothers’ work, which presented their workers, friends and others in environments that stretched far beyond the rear of the screen’s flat plane. Though a single stationary shot showed spectators a train’s arrival in *L’Arrivée d’un Train en Gare de la Ciotat/ The Arrival of a Train at La Ciotat Station* (1895), the use of the real location and the deep “staging” presented through the camera’s position and the locomotive’s motion from background to foreground illustrated greater depth than the two-dimensional screen apparently had.

It should be apparent to the reader that this chapter has already shown such aesthetics within Méliès’s own films. Though he did not use cut-ins and often purposefully restricted his filmmaking to the studio he was quite able to facilitate enlargement of the screen space, albeit on a more theatrical level. Of course, as film techniques and narrative became more established and more sophisticated technology became available, filmmakers moved to stretch the extent of their viewpoints far beyond what the confines of single shots and films of shorter duration had provided. Yet the medium retains the base aesthetics of studio shooting and the ability to expand the frame through the insertion of elements against a blank space is still greatly apparent and becoming more prevalent.

*Sky Captain* namely follows this by using the blank blue screen stages of Elstree Studios, to create an enlarged location that enables the displacement of people into a space that does not observe the spatial parameters of the original stage and screen, the cinematic equivalent of a illusionist’s box or compartment. Pringle notes of the frisson mentioned above, that there was a conflict of vision in which “the rapid interplay between space sensed as deep and then flat, as static then dynamic, clear then thickened, would produce an overload of scopic sensations” (342). In stage illusions this heightened the sense of mystery and interplays between clarity and obscurity (Ibid.), and within *Sky Captain* similar principles are achieved. By invisibilising the blue screen stage the film manages to bring into view mountain ranges, Manhattan streets and buildings, deep oceans, cavernous hangers and wide skies filled with a series of secondary and tertiary
elements. As audiences watch the film the frame is filled with various environments that open up the spatial parameters beyond that of the screen, similar to other locations and stage fabricated settings might. But awareness of the techniques used would have cemented and furthered the obscuring of spatial dimensions. As Jensen states in his *Entertainment Weekly* piece:

No “real” locations were used, no "real" sets were built; the only "real" things in Sky Captain are the actors and the props they touch. A typical day had the actors shuttling between three bluescreens, pretending to be in snowy Nepal, the jungles of a monster-inhabited island, and Radio City Music Hall. (“Rhapsody”)

Roger Ebert, who made as much note of the film’s technical achievements as its entertainment value, concurs. He extols the value of the film’s look and technique, going on to note it was a film “of enormous scope […] made with a reasonable budget, but it also freed Conran and his collaborators to show whatever they wanted to, because one digital fantasy cost about as much as another” (“Sky Captain”).

It is not necessarily the fact that the filmmakers can do this, since previous filmmakers have concocted similar fantasy environments in many different ways, or that Conran manages to improve upon earlier versions. Of importance is that he chooses to do it through techniques that essentially digitise Méliès’s production techniques, managing to further them whilst still recalling the past. This technique also recalls what Bolter and Grusin term remediation, a term that is developed by the authors where various digital media (the Internet, computer generated imagery etc.) “borrow” from antecedent analogue media (such as painting, television and film) in order to define themselves. However remediation works both ways, with existing antecedent media also borrowing and defining themselves against the newer media forms. The authors state remediation as a theory that sees various media being entangled with an almost inbuilt need to remediate. They continue, noting that a medium, “[I]s that which appropriates the techniques, forms, and social significance of other media and attempts to rival or refashion them in the name of the real” (65). It is not something only developed within digital media, but something seen in almost all existent media – where film appropriates
aspects of photography, which itself developed its formal attributes from painting. Similarly television news broadcasts sought to develop out of newspapers, splitting their programming into sections that ranged from lifestyle news and political debate to weather forecasts and headlines. In addition the authors also note that antecedent media also try and interweave aspects of a more recent medium into their own make-up. Noting “Older electronic and print media are seeking to reaffirm their status within our culture as digital media challenge that status” (Bolter and Grusin 5). They mention the Internet as using webcams that situate us in “real” locations, trying to establish a sense of reality akin to being there, like a live broadcast on television. But, alternatively, we see broadcasters such as the BBC News Channel and CNN using a series of informational boxes set within various portions of the screen that avail information akin to the windows seen whilst using a computer. Thus we have weather temperatures and basic graphical information of the climate, set below split screens of video from different locations (e.g. the home studio and a reporter’s location) as well as a ticker tape expressing the on-going news – a medium which was itself first seen in the 1870s.

When watching *Sky Captain*, the extent of remediation becomes very apparent in a number of ways. We are at once seeing a film that makes use of an inordinate amount of digital techniques, aspects of which were flagged up by certain press reviews and bloggers with *Empire* Magazine’s William Thomas making note of the CG backdrops and compositing (“Sky Captain”). Whilst Ben Walters highlights the computer generated world and digitally composited *mise en scène*, he also notes the whole visual enterprise as “reverse engineered” (“Sky Captain and the World of Tomorrow. Review”). This latter remark acts as a critique of the lacking plot and emotional core of the film, but Walters’s words also underscore the constant back and forth motion of the film, its creative drive and make-up. Consequently we are able to see precisely manufactured digital backdrops that are layered onto bluescreen stages that made use of analogue photographs. In addition other carefully constructed digital aspects were combined that mimic painting, both in fine art as well as the antecedent technique of matte paintings.

The creation of the huge robots that walk down the Manhattan streets were also digitally manufactured and partly animated by software (together with keyframes set by animators), but are themselves replete with a jerky motion that recalls the stop motion
animation of Ray Harryhausen and Willis O’Brien. Both O’Brien and Harryhausen were responsible for films (from the late 1910s and 1940s respectively) using small models containing armatures that enabled precise movements to be made, which were photographed and then moved incrementally. By repeating this methodology sequences in these films, when run at normal speed, would give the model the illusion of life, but with a slight stuttering hesitancy throughout, due to the stop and start of the camera. This can be seen occurring in Sky Captain, fitting into a milieu that aspires to productions such as Flash Gordon and Buck Rogers serials (Frederick Stephani (Ray Taylor, uncredited) and Ford Beebe and Saul A. Goodkind, respectively; both 1939) and Edgar Rice Burroughs’s John Carter character (in various publications 1912 – 1940, and Andrew Stanton’s 2012 film). But alternately the ideas, characters and iconography are visualised by digital technology, reiterating techniques that are combined with Méliès’s use of the black art.

Noting the inclusion of homages to Edgar Rice Burroughs’s work, Flash Gordon and all manner of other stories, films and older texts, it is possible to see that the film wholly locates itself in a continual flux of temporal and spatial movement. The intersection of digitalised back drops, conjured from old analogue photographs, together with a plot that repurposes serials (both cinematic and literary), and most importantly the use of digital black art technique, show the film as working to incorporate both new and old into a seamless whole. Bolter and Grusin note remediation as a reflection of immediacy and hypermediacy, or the implicit versus explicit situation and prevalence of a medium to its users. Immediacy in a media is defined as being transparent, unseen, where “the medium itself should disappear and leave us in the presence of the thing represented” (Bolter and Grusin 7). They note digital composting as a manifestation of immediacy within modern film, where the layering of several elements is achieved seamlessly (Bolter and Grusin 23). But the essential parameters of immediacy are that any media effaces its apparatus to the viewer or recipient, so that he or she sees, or receives the medium as if it is real (Bolter and Grusin 6). Examples would be a live first-person perspective television show such as M*A*S*H*’s “Point of View” (1978) episode where we see a soldier’s perspective as the medics work on him. Another example would be the radio 1938 dramatisation of H.G. Wells’s War of the Worlds by Orson Welles,
which gave the impression that the drama was a real live breaking news story. However, immediacy is also dependent upon hypermediacy – that there is in fact a medium present and that the visual space is mediated.

Hypermediacy then is that “style of visual representation whose goal is to remind the viewer of the medium” (Bolter and Grusin 272), and points to an interesting moment of frisson between audiences and the media they are consuming and reading. Because, cinema in general, and more specifically through the VFX within, remind us we are watching a constructed artificial medium. Nonetheless filmmakers try to locate audiences into its midst in a way that creates a sense of verisimilitude to the diegetic world of the story and characters. And aspects such as digital compositing are one measure that creates a sense of truthfulness to the film’s world, trying to hide the fact that there is a difference between live action and CG elements. As Bolter and Grusin point out through Tom Gunning’s reading of early cinema, “The audience members knew at one level that the film of a train was not really a train, and yet they marvelled at the discrepancy between what they knew and what their eyes told them” (31). Modern filmmakers similarly seek to invisibilise the artifice of their work, and use techniques and methods to enable seamlessness. But the cinema audience still knows it is observing a film and an artificially constructed world, characters and narrative drama. Similarly the critics and reviewers quoted here highlight an awareness of Sky Captain’s use of existent narrative devices and characters and a superficial understanding of aspects that were gleaned from visual design and techniques already in existence, but meshed with modern ones as well. The concept of invisibility seen within the black art and the cinematicised variants is therefore encapsulated and enforced by remediation’s use of hypermediacy and immediacy. Critics and audiences become entangled in a frank engagement with the work on show and the film’s declaration of old and new media’s interaction.

Through the compositing of the images onto the blank bluescreen stage, Conran’s film creates a unicity of space that continues the idea that filmmaking like magic illusions is transformational, exciting, and most important, engages audiences in the event. Pringle asserts the tricks concocted on stage developed a “subliminal awareness of an elsewhere that was not supernatural” (342), which allowed audiences to travel to and play within spaces without becoming visibly shaken. Modern society is keenly aware of the rational
over the supernatural, where technology of cinema and other electronic media is broadly understood as a technological product. But audiences are still willing to enter and vicariously dwell in spaces that flirt with other dimensions and spaces. Using compositing to conceal the current space – the space at the time of capture – and replacing it with new temporal and spatial environments – the digital element – *Sky Captain* unveils visual spaces that draw us back and into new domains. This produces a unicity that is nonetheless liminal, where the visual fabric of the film is in an intermediate state of being. This is because the film’s use of old and new objects, characters, style and narrative, plus the use of analogue and digital practices, creates a shifting state that converges current and past elements together, returning us to the past of the 1930s film style and tone.

Pringle’s conclusion sees her positioning the spatial configurations of stage illusions as frequenting the architecture of galleries and design projects. Within such large scale spaces, she notes architectural students conjure things “that are reversible; spaces that have the ability to turn into other things, to fold up, or to turn inside out; spaces that have parallel spaces running next to them; spaces that live below the surface or within the walls” (343). She deems modern stage illusions as now being “literally exhausting”, and contemporary architecture and buildings providing interest. But arguably films such as *Sky Captain*, alongside *Sin City* (2005) and *300* (2006) also follow such precedents. By using blue/greenscreen stages to infuse numerous non-physical architectures, locations and objects into the frame, the directors and craftsmen involved allow the building of spaces that greatly expand the original area in which the physically present actors performed. Rather than opening out the frame through actual locations and studio constructions, these films reveal greatly expanded visions that become visualised through the ironic invisible capacity of compositing and effects. No longer requiring a suffusion of physical elements, the digital compositor draws together the most un-physical of structures.

Moreover it is of great note that audiences entering these worlds witness evocations of events set considerably earlier, rather than modern or futuristic environs. The black and white aesthetic and stylistic tone of *Sin City*, recalls the 1930s pulp fiction of Hammett and Chandler (as seen in *Black Mask* magazine), but generated and
visualised through digitised backgrounds and lighting. Similarly *300*, is an overtly stylised retelling of the Battle of Thermopylae of 480 BC, whose production placed actors playing soldiers of Sparta in locations generated virtually by computer workstations and artists. Such work enabled vast expansion of the set used, accommodating huge skylines and much else. But these films also continuously play with the temporal positioning of the film as modern technical productions. Because the films offer expansive vistas but use little in the way of profilmic sets and props, the techniques ultimately return us to Méliès and his stylistic aesthetics and further back still. The films may be longer, using synchronised sound and using more technically sophisticated means to achieve their duration, but they arguably still evoke Méliès’s own. Note the comparative still from *300* (Figure 2.13), where the Spartans meet further soldiers on a practically constructed incline. The final image underneath not only layers in the skyline with its evocative clouds and sunbeams, which suggests a distance far beyond that of the rocky landscape and the cinematic frame, but also a de-saturated, almost monochromatic look suggestive of older historical and Biblical epics made by De Mille, Griffith et al. This shot and many others in the film also ironically evoke a sense of two-dimensionality that, despite the beams that crest the incline, gives the shot a pictorial sensation akin to still photography and paintings. Perhaps this is due in part to the feature’s basis as a graphic novel, but it is also appreciable that the two-dimensionality seen here is united to Méliès’s own style, seen in *Le Voyage dans la Lune* (Figure 2.14).
Pringle points out that many architectural designs seek to provide sensations that are “setting us outside of time altogether”, and cinema also has the capacity to do this – perhaps even more forcibly. By inserting the digital elements that complete the scenes within Sky Captain, 300 and other similarly structured films, we are able to vicariously enter an area within the cinematic frame that is distanced on numerous levels. Though it is an aspect present within most films, the use of compositing allows an even greater development of the practice. This is because digital compositing allows the removal of a relatively small stage set and, by invisibilising this space, creates further spaces “that seem larger inside than seems possible from the outside” (Pringle 343). Temporal and spatial dimensions are able to be squeezed, moved and reassembled, repositioning the audience on a spectatorial level, whilst the films themselves move us further into the past, the techniques move ever further forward. By invisibilising original staging areas through the infinitesimally materially sized (yet measurably more powerful) computer, audiences can be transported back and forth by the screen’s images. This takes them on a journey narrationally forward into new dimensions that are still paradoxically set in the stylistic past of Méliès, and before him the black art. Physical space is washed apart and conflated, as is time, with audiences becoming housed in a new area where digital technology allows the creation of new realms. The achievements of both Méliès and more recent filmmakers like Conran highlight the constant fluctuating nature of both analogue and digital cinema in situating physical aspects within a distinct spatial footing. These films position themselves as capable of playing with the structural and physical record of film, becoming malleable
indexes of registration. But it is clearly not an aspect seen solely in the modern electronic age.
Chapter Two: Reviewing Realism - the creation of *mise-en-scène* in the
digital age

Introduction.

When viewing films and studying cinema, audiences are constantly engaged in
scanning and listening to them, either explicitly or implicitly. A massive part of this
inspection is based upon said audience scrutinising the film frame, focussing upon those
visual aspects that collectively make up a film’s *mise-en-scène*. Loosely translated, *mise-
en-scène*, a French term, means “staging of action” (Bordwell and Thompson 145), or
“putting into the scene” (Konigsberg 240). It is largely, but not exclusively, built from
four constituent elements: setting, lighting, costume and the behaviour of the figures
(Bordwell and Thompson 145). The inherent characteristics of *mise-en-scène* have long
been discussed, with particular attention paid to the way in which film directors carefully
orchestrate this stylistic system in order to create part of a film’s overall form. As
Bordwell and Thompson state: “In controlling the *mise-en-scène*, the director stages the
event for the camera” (Ibid.) and in doing so sets up a series of elements that spectators
consider and decode.

When watching any film, we move to piece together the parts of the *mise-en-
scène*, the physical constituents of the frame, to make sense of their compositions and the
meanings and inferences that might result from their combination. This is sometimes
merely to establish a commonsensical impression of the film’s diegetic world – such as
room or location – in order to anchor us within the narrative. But, further to this elements
of *mise-en-scène* are also apt at enabling filmmakers to produce meaning from the textual
elements that connote meaning of a more metaphorical and figurative nature. One such
example can be seen in *Citizen Kane* and its use of Charles Kane’s sled – seen near the
film’s start, during a flashback to Kane’s adoption as he plays in the snow, and at the
film’s close as it is seen burning in the mansion furnace. In the first instance the sled
seemingly represents the young Kane’s toy that he is merely playing with – its position in
the snowy scene a reflection of what many other children would perhaps be doing in such
circumstances. But by the close of the film, its sudden reappearance is tied to a series of other elements that create new meanings and answer certain narrative questions. The first of the connections is to “Rosebud”, the word uttered by Kane as he dies and the centre of the quest undertaken by the journalist assigned to investigate him. Further to this is its connection to other elements of the film’s *mise-en-scène*, such as the snow globe Kane drops after speaking his last words. Similarly, as the globe drops and smashes we see it as a dramatic moment that draws the nurse into Kane’s room, but by the close of the film the globe is also seen as a connection to Kane’s memories of the day he left his parents and the boarding house, and the sledge which is emblazoned with “Rosebud”.

This reformulation of what we see, or think we see, begins to place stress upon certain theoretical deliberations surrounding *mise-en-scène*. André Bazin gave great weight to the way in which *mise-en-scène* was more able to produce realistic intent within films, seeing it as a more proficient practice than that of editing. Rather than falling upon practices of editing to simultaneously join two or more factors in one scene in order to create the diegetic world of the film, Bazin saw the rudiments of *mise-en-scène* as more proficient (“Virtues and Limitations” 50). This allowed the spatial unity of the film to be more respectfully addressed and sustained. But, when interpreting *mise-en-scène* spectators are constantly reconsidering what has previously happened, reformulating the unity and reality of the perceived *images*. Subsequently this can be seen as an inquiry into how we can approach further theoretical areas of *mise-en-scène*, developing new perspectives involving concepts of invisibility.

Compositing, which entails the “combination of two or more components from separate shots” (Konigsberg 70), especially in its digital form, can allow filmmakers to produce an integrated *mise-en-scène* from wholly separate elements. A basic illustration can be seen in *The Lord of the Rings: The Two Towers* (2002), which features the computer-generated character of Gollum. Gollum was produced through digital animation programs and performance capture, but was ultimately placed into the *mise-en-scène* via the skills of compositors and effects animators (see Singer “The Two Towers: Face to Face”). Although this is a complex process, the practical conceit is nonetheless a continuation of previous, pre-digital practices.
In effect the object to be composited is shot against a screen, often blue, which is then blended by a system that removes the blue background and replaces it with the main footage, i.e. a background plate (see Brosnan 110 –111). Though the depiction of Gollum revolves about the actor Andy Serkis’s performance being recorded as a series of reference points onto which CGI is layered, it is nonetheless an element that is subsequently taken from one staging area and combined with separate live-action footage. The background of the stage of the performance is entirely lost and made invisible, before being made visible via relocation and attachment to the final background (Figure 3.1).

As Lev Manovich notes, the intent is that “separate identities become invisible” (“Language”136), by replacing portions of the final shot, making aspects of the main shot’s scenery invisible and in addition making portions of the staging of the photographed element invisible. The following pages contend they therefore bear down upon the practices and theories of \(mise-en-scène\). Compositors and VFX artists practice this form of invisibility in order to draw greater power and success from taking apart the physical constituents of the practices used. By discussing the notion of taking apart physical forms and their being made invisible this chapter will seek to discuss how \(mise-en-scène\) and compositing, together with similar practices of VFX, become joined in order to correlate aspects surrounding the power contained by invisibilisation. Using André Bazin’s work in association with other theorists who both criticise and continue his work on realism, I will highlight how the theoretical character of \(mise-en-scène\) as noted by Bazin can be reformulated and addressed in new ways. This thesis will be
investigating how digital media impacts realism through compositing practices, using older and newer critical dispositions. These include Stephen Prince’s “perceptual realism”, which counters established models of realism within digital effects, alongside Laura Mulvey’s explorations of digital versus analogue media and D N Rodowick’s analogous discussions, and how we might restructure our understanding of cinematic realism within digital compositing through the works of Stanley Cavell and Stephen Pattison. Using these works I’ll be focussing upon the way compositing uses *mise-en-scène* to restructure the frame, invisibly layering elements in place and fracturing aspects of spatial unity, concreteness and therefore notions of realism and how the way in which we view *mise-en-scène* in certain films necessarily consolidates Bazin’s ideas even as they are critiqued.

**Seeking a Purer Cinema.**

For *mise-en-scène* to be explored and critiqued through the areas of compositing and VFX it is necessary to lay down certain theoretical bases surrounding how the area has previously been considered. As noted in the introduction critics have placed great importance upon *mise-en-scène* in delivering cinematic imagery more realistically and dexterously than if the shots were comprised of more overtly designed settings or edited in unison with others. Thus André Bazin sees *Citizen Kane* as having more realistic intentions than the German Expressionists’ work, such as Robert Wiene’s *Das Cabinet des Dr. Caligari/The Cabinet of Dr. Caligari* (1920) or the use of editing in Sergei Eisenstein’s *Stachka/Strike* (1925). Accordingly Bazin saw in the deep focus compositions of Welles and cinematographer Greg Toland a restoration of reality selected by the mind of the spectator over the a priori selective processes instilled by editing (Bazin “An Aesthetic” 28). Bazin notes that Welles’s camera in *Kane* “takes in with equal sharpness the whole field of vision contained simultaneously within the dramatic field” (Ibid.).

But it’s important to note the variability of cinematic realism, especially since the years following Bazin’s period of criticism aspects of cinema, including technology and
its incorporation into creating a film’s diegetic world, as well as theoretical rationale has changed. As John Ellis states:

[T]here is no realism, but there are realisms: a series of arguments, justifications, and procedures for the production of representations alike. The appeal to the idea of ‘realism’ to justify a particular representation will probably rest on more than one of these arguments. (8)

Ellis suggests cinematic realism is a complex construction because the word is “being used to describe a whole series of principles of artistic construction and of audience expectation alike” (6). He continues by stating realism denotes an expectation that the cinematic representation present “a ‘realistic portrayal’ of character and event” (Ibid.) But beneath this tautology rests further multiple possibilities. These possibilities are surface accuracy, that the action on screen conforms to aspects we expect to happen, and that the realism explains itself to audiences adequately. Further to this realism should use rules and cues pertaining to the psychological and social attributes of the characters in the particular diegetic world (Ellis 6 – 7). These regimes however can be supplemented, Ellis says, by a series of extra factors that may be spectatorial or theoretically based in their nature. As such the criterion upon which realism is based might well be one of compromise, particularly when dealing with aspects of explaining itself to an audience and producing a realistic world and characters “as they are or were” (7). In this last conception, as with other critical discourses that shall be examined here, Ellis argues that, “It can quite cheerfully admit large-scale divergences from accepted notions, but it sets the terms on which such representations can be comprehensible to audiences as realistic representations” (Ibid.)

Stanley Cavell also highlights some divergences from Bazin’s viewpoint, noting the problems of his conceptualisation of cinematic realism being based upon physical objects and their photographic capture. Where Bazin sees photography and film providing a concrete transcription of the object through technology, one freed from the subjective handling of the painter, Cavell highlights the problems that ensue between the techniques and aesthetic principles of each media. Bazin says: “The objective nature of
photography confers on it a quality of credibility absent from all other picture making,” which then provides us with the photographic image, which is: “the object itself, the object freed from the conditions of time and space that govern it” (Ontology” 13 – 14). However, Cavell opines:

Physical reality as such," taken literally, is not correct: that phrase better fits the specialized pleasures of tableaux vivants, or formal gardens, or Minimal Art. What Panofsky and Bazin have in mind is that the basis of the medium of movies is photographic, and that a photograph is of reality or nature. If to this we add that the medium is one in which the photographic image is projected and gathered on a screen, our question becomes: What happens to reality when it is projected and screened? (16)

Continuing this thought, Cavell notes that, ultimately, projected cinematic films diverge from the painting because there is nothing physical about what we finally visually perceive. Unlike the visuals of a painting, where paint is actually supported on a canvas “The screen is not a support, not like a canvas; there is nothing to support, that way. It holds a projection, as light as light” (Ibid.). Similarly Cavell sees the photograph, that technological marvel Bazin sees as a visual mold of the physical object, as deficient, stating:

[P]hysical molds and impressions and imprints have clear procedures for getting rid of their originals, whereas in a photograph, the original is still as present as it ever was. Not present as it once was to the camera; but that is only a mold-machine, not the mold itself” (Cavell 20)

In this respect we can begin to see how Bazin’s concept of cinematic realism, its basis in the physical world becoming transcribed within and projected by film, becomes enmeshed with aspects of absence and invisibility, and that the physical object begins to disappear into a miasma of physically insubstantial light. Moreover in this chapter’s concerns surrounding realism as part of a concrete world captured as it notionally
appears, we can begin to see that realism as a physical construct captured more definitively by film, is also under duress.

Discussing the implications of Erich von Stroheim’s "realistic" work against the contemporaneous users of the “image” – where style within mise-en-scène creates “plastics” and montage, which processes the photographed world through editing – Bazin says Stroheim’s films lay reality bare. Bazin states his films place faith in the captured object alone, taking “a close look at the world, keep[s] on doing so, and in the end it will lay bare for you all its cruelty and its ugliness” (“Evolution” 24). This is against faith in the image, or the manufactured visual elements based upon those aforementioned additions to the recorded object. This is a characteristic Bazin sees continued in certain 1940s Hollywood and Italian productions, where new blood injected a change in subject matter and through technology allowed a use of deep focus, which captured the objects in wider and greater detail16. In particular the work of Toland and Welles in Kane produces a sense of continuity that had been lacking in films, such as D W Griffith’s, where editing manufactured continuity, creating an abstraction from the realistic flow of information encapsulated by the photographic object (“An Aesthetic” 28). As a continuation of these points compositing practices, which arguably involves the manufacture of the mise-en-scène through the incorporation and imposition of various additional elements and objects into the frame, might obviously be seen as going against Bazin’s objective photographic “purity”17.

Yet even Welles’s Kane is not bereft of compositing, with many shots, including the approach to Kane’s estate Xanadu, using a combination of live-action performance with the separately photographed element of a model (see Figure 3.2). Though staged in depth, allowing the spectator’s gaze to roam about the organised imagery, the shot is not strictly unified, concrete or unambiguously created. Indeed the work of Linwood Dunn,

16 Although Bazin does note the use of such techniques prior to this point, citing Jean Renoir as one such practitioner (“Evolution” 30).
17 Where purity is concerned, Bazin is keen to point out the different poles which are developed, citing Farrebrique ou Les quatre saisons (Georges Rouquier 1940) developing realism through “raw, natural settings, exteriors, sunlight and non-professional actors”; whereas Welles’s Kane uses improved film stock and lenses to catch the world and impartial meaning of the objects within in depth, rather than abstracting it through editing (“An aesthetic” 28 - 29).
head of VFX at RKO, features prominently throughout the film, compositing numerous elements together to produce seemingly unified shots. Such shots highlight how a film such as *Kane*, where Bazin championed the cinematographic unity of its *mise-en-scène*, can be viewed as a juxtaposition of disparate elements.

A second scene featuring Kane’s second wife Susan (Dorothy Comingore) promotes similar intentions. The scene in question presents the opening night of Susan’s operatic debut and the first critical appraisal it receives, using one apparently unbroken shot. Following a series of dissolving shots showing the rehearsal, we settle in a wide and deeply focussed composition showing the last minute preparations on the first night. At this point our eye is presented with a crowded and detailed *mise-en-scène*, showing Susan and other characters interacting with each other and with other elements, such as the lighting, various props and the surrounding scenery of the opera house stage. This begins to paint a scene for us wherein we can fluidly scan the frame in order to draw our own conclusions about the nature of the moment and the characters’ feelings, and to observe more ambiguously the sensibility of the narrative.

This ambiguous nature of interpretation, seen in the unbroken shot, is posited against the controlled certainty of editing and montage that, Bazin stresses, more forcefully directs audiences in calculating reaction for what is seen. Bazin cited Kuleshov’s experiment, where a series of identical shots of an actor’s face were edited together with different alternating shots. Audiences believed that the actor’s expression changed, when in fact it did not, a meaning Bazin saw produced by the deliberate construction through the editing. Films such as *Citizen Kane* with its use of deep focus
and associated staging in depth conversely allow the viewer to roam the frame’s composition at will. As Bazin says:

*Citizen Kane* is unthinkable shot in any other way but in depth. The uncertainty in which we find ourselves as to the spiritual key or the interpretation we should put on the film is built into the very design of the image. (“Evolution” 36)

It is this uncertainty and ambiguousness that is espoused by the unbroken nature of deeply staged and uncut scenes that make use of the audience’s ability to move scopically through the frame and decode the mysteries of the film’s plot, its characters and its themes. As the curtain rises, signified by both a receding shadow that pulls upwards and the rising of the camera itself (Figure 3.3), the scene seems to continue, apparently still unbroken, as we move up through a series of suspended flats and cables, to finally rest upon a pair of theatre technicians in the gantry high above. We’ve seen the chaos of the theatre personnel readying Susan, and the movement of people, props and ephemera across the fore-, mid- and background of the frame. Such on-screen matter might be read as a continuation of the movement back and forth between geographical and temporal zones seen in the rest of the film. It might also be viewed as beguiling and intentionally enigmatic, espousing sensations of the narrative’s own mysterious nature. In addition, the stage backdrop features an imposing and ancient castle that alludes to Xanadu, the huge building and estate Charles Kane constructed for Susan. Throughout this scene, and as we move up into the opera-house’s upper levels, we are able to view aspects of the *mise-en-*
scène rather indistinctly with our viewpoint not specifically directed through close-ups, and explicit changes to a point of view.

However, though purporting to be a single shot, and pulling upon spectators’ perceptive capabilities to roam in a manner that recalls Bazin’s uncertainty - ambiguously reading the mise-en-scène - the filmmakers instead used a series of “edits” to produce an illusion of spatial unity. In fact the shot features a series of changes within its make-up – cuts that are unseen because they do not visually move away from the overall shot, but nonetheless spatially assemble separate pieces of filmed scenes. During the shot, Welles, Greg Toland, Dunn and company insert a series of new individual elements, comprising a set of matte paintings of the theatre rigging and scenery. Using the curtain awning and subsequent pieces of architecture the filmmakers assemble separate shots - breaking apart the entire width and depth of the frame between the initial shot of Susan and the two technicians. This creates a series of discrete elements, which though apparently synchronous, were in fact recorded separately and shot at different scales.

In order to achieve this, Welles and company used both optical compositing and, in effect, practices of editing, blending the separate shots into one. To achieve this the live-action elements that bookend the shot were first duplicated and along with the matte paintings, which were shot with a matching rise in camera movement, composited together using an optical printer and a “wipe”. In order to create a wipe, the duplicated film elements are again re-photographed using the optical printer and a wipe blade, a specially fashioned matte, is moved across the beginning and end of each piece of film to be joined (see Brosnan 53 and Fielding “Techniques” 168 - 170). The wipe technique was often used in narrative filmmaking, permitting scenes to flow together more smoothly than if a hard edit was used. Most especially, the technique allowed the passage of time to be conveyed much more fluidly and gracefully when a narrative shifts in space and/or in time, as when we follow characters in George Lucas’s Star Wars (1977), such as Luke and C3-PO as they try to find R2-D2 on Tatooine. Nonetheless, though optical wipes are smoother than directly cutting between shots the gradual disappearance of the previous shot and simultaneous appearance of the new is readily perceptible as a dark line when the older shot recedes and the new one materialises. But, by using the edges of the aforementioned curtain top and similarly hard-edged scenery, Dunn hid the breaks in the
separate shots and of the optical wipe itself to produce the apparent continuation of the shot. The implementation of the hard edges of the curtains and stage gantries at the start and end of each necessary element carefully hide the joins of what is both an edited sequence, yet also an ultimately compositied scene (Figure 3.4). The wipes are no longer so easy to spot and the technique demonstrates compositing’s ability to make invisible the seams of separate shots, as well as making invisible other unwarranted visual portions of the soundstage that would have been seen in the opening and closing shots.

Dunn’s work in *Citizen Kane* highlights that compositing accomplishes the impression of homogenous *mise-en-scène*, but it actually integrated discrete imagery produced outside of the apparently profilmic event witnessed by spectators. The essential practices in many ways parallels the techniques of editing, but more imperceptibly. Here, Dunn and his colleagues effectively take the physical elements - a matte painting, the live-action *mise-en-scène* photographed on a soundstage - and subsequently pull them apart, rearrange them and recombine them for the final scene. Dunn’s work effectively makes invisible the unwanted top of the set that would be seen when the camera rises in the opening moments, removes the steps between the performers and reconstitutes them, and other aspects of *mise-en-scène* and uses the optical printer to produce presence through absence and invisibility. This in turn begins to transform the theoretical basis surrounding *mise-en-scène* onto which Bazin clings, beginning to unlock his specific notions and meanings of *mise-en-scène*’s position as a purer representation of cinematic form and realism. For the filmmaker it furthermore demonstrates a greater constructive power than if they had remained based in the apparently purer form of *mise-en-scène*. 
Bazin highlights Eisenstein’s work, along with so-called classical editing, as techniques that separated reality into “successive shots which were just a series of either logical or subjective points of view of an event” (Ibid. 28), deeming them inferior means of preserving the integrity of a profilmic event. Instead, as already noted above, it was in the plastics of the image, the *mise-en-scène*, that reality could be more truthfully realised. Though he was not against editing to join scenes and make transitions, Bazin believed that the art of *mise-en-scène* used within deep focus compositions and neo-realist films was the preferred and more decisive style. In so doing, he theorised that *mise-en-scène* would allow spectators to embroil themselves in the more ambiguous substance of reality (Bazin “Evolution” 35). Rather than breaking apart carefully enframed celluloid imagery into separate pieces which would only allude to an event (Bazin “Evolution” 25), the use of such plasticity would allow a filmmaker to inscribe his or her film with a concrete unity and a spectator to more objectively read the imagery, rather than having the images systematically conjoined and imposed upon them.

And yet, as we have noted, the compositing work within *Citizen Kane* creates scenes that conjoin separate elements, whilst also allowing a viewer to regard the entire scene at once. Ron Brinkmann notes of digital compositing that it is “The digitally manipulated combination of at least two source images to produce an integrated result” (2). In essence, digital compositing proposes a seamless integration of numerous discrete elements into one synchronous whole. Stitching together imagery in such a way depends upon the layering of a series of essentially invisible, or only partially seen pieces, on top of one another, and is a more streamlined version of optical compositing. Arguably the work of any compositor can therefore be seen as effectively combining (or editing together) a series of logical points of view, but the logic is simultaneously synchronous and organised ambiguously as a long shot. As Lev Manovich notes, digital compositing works as a “counter part to montage aesthetics” and in so doing produces an “aesthetics of continuity” that constitutes an invisibility (“Language” 144).

This invisibility is achieved through digital compositing’s ability to accomplish its action through seamlessness. As noted in chapter one though optical compositing also combines disparate elements into a final “unbroken” image, the technique had certain deficiencies, including a loss in quality dependent on the number of duplications needed.
More critically the “cut and paste” nature often lead to conspicuous matte lines around each element. Though more attention and detail from compositors can help in obscuring the matte lines, the optical technique cannot overcome the problem as easily as can digital processes. As Manovich relates, elements from live action plates, models and 3D computer generated objects are, in digital compositing:

[A]ligned in perspective, and modified so they have the same contrast and colour saturation. To simulate depth of field, some elements are blurred while others are sharpened. Once all the elements are assembled, a virtual-camera move through the simulated space may be added to increase its “reality effect. Finally, artefacts such as film grain or video noise can be added. (“Language” 137)

The use of computers allows compositors to overcome the problems of duplication, because digital media permits a duplication of imagery that is “lossless”, and therefore produces images that are identical to the original. As a consequence, when compositors produce shots that utilise many separate elements, the finished shot features a blending of images that are seamless, and the joins invisible – as well as concealing certain portions.

Other modern composited shots arguably follow and advance such ideals. One example using digital compositing features in George Lucas’s Star Wars Episode III: Revenge of the Sith (2005).

A noticeably fantastic and spectacular film, Sith uses an inordinate number of VFX elements within its length, yet the opening shot runs for over a minute, and arguably emphasises Bazin’s analytical theorisation of mise-en-scène, whilst also drawing upon concepts of editing. Following an apparently omniscient viewpoint, the shot opens upon a field of stars, before panning down onto a vista featuring a bright sun above a planet and a large spacecraft. The frame continues to dwell upon the ship, bearing down upon it, before slowly pirouetting about its mass as two much smaller ships fly into view. We then draw close to follow these new ships as they travel quickly across the hull and continue with them as they drop downwards into a vista that is full of other various large ships, as well as numerous smaller craft, and the planet Coruscant that stretches across the background (see Figure 3.5).
Furthermore, numerous explosions, pieces of debris, and other ephemeral imagery intersect the view of the ships and planet, competing for our attention within the dense field of view, and continue until the shot finally cuts.

As the shot un-spooling, spectators are practically encouraged to move their gaze about the film frame, in which the viewpoint is often rapidly moving in a looping motion. This resonates with Bazin’s want for spectators to embroil themselves in a film’s reality, and to scrutinise the elements of the image. At once we can follow the smaller ships, look at the larger craft, pick out the bursts of fire and examine the different planes of the mise-en-scène arranged in depth. But simultaneously the shot is awash with elements that are abstract, since we must subjectively isolate their substance in order to read them. Yet this is arguably an unconscious action, where the viewers implicitly work through the whole of the collective mise-en-scène, and is dependent on the transparent, and invisible, layers of composites used.

Consequently, the shot in this sequence, and as we shall see in others throughout Sith, plus other productions, use compositing and effects techniques to reformulate both the fabrication of mise-en-scène and surrounding theories concerning realism and concreteness. In this case the conception is perhaps justified by the fact that the vast majority of the images within, and indeed the entire production of the shot are realised by digital means. Most of the VFX, produced by artists through computer workstations and software, are achieved through virtual means. Similar processes generate the apparent camera movement through such space and the final shot is also composited through digital means. No doubt this is a form of mise-en-scène not entirely foreseen by Bazin
and his followers in the pre-digital analogue world, amongst them the director Jean Renoir, and critics/directors Jean Luc Godard and Alexandre Astruc. However, he does point towards and criticise the use of process shots, stating that, not only can they be spotted but that such techniques’ only achievement is to highlight that trickery is in use rather than observing the authentic “body” of what is photographed (Bazin “Virtues and Limitations” 46). Observing such ideas would obfuscate the position of Sith’s opening shot. Rather Bazin would wish the image be created by real means, as in his footnote observance surrounding the creation of a shot within Harry Watt’s Where No Vultures Fly (1951). Bazin notes that the climactic shot of an otherwise lacklustre piece of editing centred upon a tiger stalking a child triumphs because it is produced with the use of real animals and actors in a single shot (Ibid. 49). But, in the case of Sith with its myriad uses of illusionism and spectacle, for Bazin it is more likely that it should not exist at all.

However, as with the creation of sequences within Citizen Kane there must be pause in overtly decrying the use of such effects, compositing, and the creation of conceptual editing, because in Ladri di biciclette/Bicycle Thieves (1948), certain scenes make use of process shots and illusionism rather than the purely objective naturalism so favourably noted by Bazin. There is the scene where Ricci and his son travel with their street cleaner friend in his truck, which makes use of the rear-projection technique (see Fielding “Techniques” 259 – 260). A system particularly effective at allowing filmmakers to produce realistic-looking scenes without the main production going to locations, it illustrates a conflicting creative impulse. Additionally, Ladri di biciclette uses studio sets over actual locations, and some use of artificial lighting alongside highly proficient camerawork (see Thompson 211).

Such techniques point towards a fracturing of the natural elements of the continuous presentation of mise-en-scène favoured by Bazin; these moments demonstrate the facility of compositing to pull apart and restructure the physicality of the elements used. Using illusionism in the creation of such shots allows its ultimate realisation. Indeed, without the use of lighting, graceful camerawork, and rear projection, the film might not be successfully accomplished. It is by making certain elements invisibly concealed, by using rear-projection to replace the blank screen behind the actors in biciclette’s truck scene, and removing the darkness of poorly illuminated location scenes
by artificial light, that the filmmakers manufacture their realism. Similarly, the work achieved in *Sith*, moves to fill in the blank spaces of the film frame, building up the area by compositing therein the many discrete necessary elements.

This removal of physical attributes and the replacement of blank spaces with elements of light, new pieces of photographic imagery and, in the case of *Sith*, digital images, can be seen as beginning to break apart the somewhat strictly configured aspects of *mise-en-scène* and its surrounding theories. As Siegfried Kracauer notes, films are “a jumble of transient, forever dissolving patterns accessible only to the camera”, and his comments highlight the nature of film as a transformative medium (11). Films therefore allow a great number of things to be assembled, but at times only certain aspects are perceptible to the viewer due to the speed and prevalence of images that flash past the eye at twenty-four frames a second. But though Kracauer believes that the kaleidoscopic emphasis of films only allows the camera to see them, cinema’s use of them can also be read as providing filmmakers with the capacity to draw upon numerous distinct elements - both optical and digital in nature. These elements, be they Bazin’s favoured assembly of *mise-en-scène*, those equally disliked pieces of film edited together, and indeed aspects of sound and other aspects of a film’s visual scheme – such as compositied VFX - that are placed into the final arrangement deliver a series of transient components. And these components create patterns of light and dark, differing colour and design, and visual textures that break the frame, revealing new aspects for the audience to read at their own will. Such removal and rearrangement of physical, profilmic and non-physical elements replaced (but also supplemented) by digital elements, opens the doorway to the possibilities of compositing as conceptually contravening the apparently natural capabilities of cinema. However, though the idea of invisibilisation might be viewed as a means of destroying realistic intent, this is in fact something that Bazin himself indirectly points towards. Towards the end of his discussion of De Sica’s film, Bazin notes “*Ladri di Biciclette* is one of the first examples of pure cinema, no more actors, no more story, no more sets, which is to say that in the perfect aesthetic illusion of reality there is no more cinema” (“Neorealism and Pure Cinema”). Though he may not have viewed it in such terms, Bazin here begins to point towards the possibilities compositing and digital technology might produce.
It is an argument continued in “The Myth of Total Cinema”, where Bazin conceives that the basis of cinema is not wholly arranged around technology, which he views as negligible compared to the people – and minds - who would put it to use. The reality and truth that would stem from the technology was bolstered by the filmmaker’s imagination. Yet technology was an important factor, since it provided “an image unburdened by the freedom of interpretation of the artist or the irreversibility of time” (“Myth” 36). Rather than an artist distorting an object or element, the shutter of a camera would open, capture the object onto film, and then close once more. But perversely, with the onset of more sophisticated technology that could more truthfully capture objects, gathering them with greater clarity and dexterity, cinema drew closer to a point that Bazin saw as a myth, though one nonetheless of importance. Bazin goes on: “There are numberless writings, all of them more or less wildly enthusiastic, in which inventors conjure up nothing less than a total cinema that is to provide that complete illusion of life which is still a long way away” (Ibid.). Ideally, therefore, as technology enabled a more explicit rendering - through colour film, stereoscopic techniques and so forth – Bazin saw cinema as paradoxically moving backwards to a primal state where “a complete imitation of nature” is captured (Ibid.). His envisioning of a more pure cinema, where certain narrative precepts and formal performance by trained actors are absolved of duty, can be seen in the way digitally produced effects and compositing seek similar goals. The drive towards the myth of total cinema is another theorisation where technology enables reality to be most purely captured. But though technology continues to improve, the ability to attain truthful reality cannot be fully attained since it would no longer be cinema, but actual reality. Cinema therefore circles the destination of reality but it lies just out of reach.

As Bazin says, “Every new development added to the cinema must, paradoxically, take it nearer and nearer to its origins. In short, cinema has not yet been invented!” (Ibid.). However, despite falling short of its origins, one implicit conclusion Bazin makes of cinema is that artifice within the medium is a necessary conceit that any idea of reality must share. Digital technology’s introduction and refinement allows a formation of a type of reality in cinema that retains certain precepts of truthfulness and of refined impressions of objects, despite being irreal in other aspects. This is because, arguably, digital
technology allows for more enhanced image capturing and the creation of carefully defined elements within a diegetic world. Using electronic, digital and other systems that remove human interference more fully creates another step towards the myth. Through the concealment of artifice and the revelation of imagery, digital compositing seeks to remove much of the real, but in so doing it also inserts “purer” cinematic imagery, where the apparent integrity of the shot, continuing unbroken in space and time, outweighs the fact that it was produced by artificial means.

Though differing from the use of untrained actors (as in Biciclette), location filming and more socially orientated narratives, films such as Sith are themselves moving in analogous cinematic circles. Where Biciclette includes non-actors, so too does Sith through its digitally produced creatures and characters (such as Boss Nass, Yoda, and General Grievous) as well as CG backdrops. These are certainly produced professionally, but the creation and realisation of their performance is distinctly different to the type of drama training the live-action actors of the film went through using a different set of skills to produce the finished characterisation. Similarly, where Di Sica’s film removes the building of fabricated physical sets and the eradicating of classical Hollywood narrative ambitions, Sith mounts visuals that are themselves physically unbuilt and a narrative that does not follow previously established norms. Instead we see the compositing of disparate and discrete imagery that both occludes and makes invisible the cinematically captured world, yet also rebuilds and reanimates it, sending cinema in new, purer directions. It is not the wholly pure cinema of Bazin, but Sith and others like it also strive for a cinema free of the established precepts of actors, prescribed story, and sets. Ultimately however it requires a new perspective of reality to be formed. How this is achieved and what it might ultimately mean for cinema and realism is the next analytical step, wherein I will investigate in more detail the processes and examples used in fracturing mise-en-scène and hypothesise their significance.

**Looking for physical forms (and finding the digital).**

As noted in the opening section, Bazin saw editing as abstracting the film’s realistic intent (“An Aesthetic” 27). He maintained that “Essential cinema, seen once in its pre state, on the contrary, is to be found in straightforward photographic respect for the unity
of space” (Bazin “Virtues and Limitations” 46). As even Rudolf Arnheim, a staunch defender of art over realistic intent, concurred, “every cut in the film strip will be mutilation,” implying strongly that such procedures would destroy the life of the film (49). Rather than stitching together a series of shots, Bazin saw the essence of cinema to be more truthfully portrayed by temporally longer shots that used minimal editing, as seen in the work of Jean Renoir. In a film such as La Règle du jeu/The Rules of the Game (1939), many scenes are built around the use of the interaction of light with the décor, the actors’ interaction with it and other actors, as well as their own positioning and performance.

One such scene centres upon a party, where Renoir’s camera prowls about the setting, following a series of characters in a series of relatively long and broadly composed shots featuring characters and narrative elements that jostle with each other for the spectator’s attention. Though he uses editing to join these shots together, the camera never cuts to close-ups, or more specific points of view. Instead we see characters such as Gaston Modot’s Schumacher, who at one point is followed by the camera in the background of the scene. But Schumacher’s performance is played out amidst other characters and features in a scene of multiple elements that are glanced in mirrors and caught in various planes of the cinematic space. This use of the elements of mise-en-scène allows an audience to, in Bazin’s opinion, see authentically into the lives of the characters, and to observe the narrative as it builds (“Virtues and Limitations” 48). This was, in the similarly attuned eyes of Siegfried Kracauer, cinema’s greatest capability. In Kracauer’s view, “Film […] is uniquely equipped to record and reveal physical reality and hence, gravitates toward it” (28). A film such as Revenge of the Sith conversely, and deliberately, strives to use the non-physical elements of digital effects and a slew of digitally composited imagery in its duration, as in the aforementioned opening shot. Though it too seeks to build a diegetic world for its elements to operate within, the constructed space is one that offers a different perspective upon creating such space. This scene is the mode of practice for Sith’s whole length, with Lucas’s film using numerous digital matte paintings and other effects elements inserted into the green screen. Furthermore, its attitude towards mise-en-scène can be seen in numerous other cinematic spectacles.
This creativity is arguably not redundant and can in fact be a useful means to address Bazin and other similarly minded theoreticians’ ideas. V F Perkins noted that Bazin found in cinema “a magical process which could order and possess the natural world by capturing its image, and resist the ravages of time by ‘fixing’ the image of a single moment” (“Film as Film” 28). For Bazin, cinema most fully captured this nature due to the mechanical process of the camera, the lens and the film, which allowed a more unadulterated representation of imagery (Ibid.). It might be said that the manipulation of images through VFX and compositing flouts such rules, and the particular use of digitally constructed images removes nature. But in cinema, nature and naturalness might be seen as a state of mind, where the creators of cinematic productions, and the audiences who watch them, make decisions about what is considered to be truthful, real and realistic. It is reasonable to note that directors make decisions in order to construct scenes, as do editors, screenwriters and directors of photography, as is the case with _Ladri di biciclette_. Therefore, the idea that the cinema of the neo-realisists is untainted, though laudable, is a questionable conclusion. Similarly, the capturing of images through cameras and lenses and its subsequent processing is again based upon a series of decisions of lighting, of gauging exposure and often manipulation during development. The implementation of mise-en-scène in cinema is similarly a constant game of manipulation. As Bordwell and Thompson note, “It is better to […] examine the functions of mise-en-scène than to dismiss this or that element that happens to match our conception of realism” (146, author’s original emphasis). Might then the deployment of compositing and the use of VFX be, in their own ways, a means of capturing a form of nature in the context of a particular film? Indeed, it is interesting to note that compositing is significant in continuing Bazin’s intentions, but simultaneously also subverts the author’s faith in the integrity of the long take. Moreover, they develop the use of invisibility as a means to restructure the physical elements, taking apart pieces of the natural world and inserting them onto a new base in order to, create, conceal and remove profilmic forms.

In _The Virtual Life of Film_ D. N. Rodowick notes that aspects of apparently auspicious “new” digital media are often couched within existing antiquated parameters. In his opening chapter the author takes time to highlight how even analogical cinema share commensurate bases with modern media that underscore this chapter’s case study.
Highlighting pre-existing foundations of analogic and physical elements and practices within the texts, and the diegetic and non-diegetic battles that ensue, Rodowick notes:

[C]omputer generated imagery codes itself as contemporise, spectacular, and future-orientated; a sign of the new to bolster sagging audience numbers. At the same time, the photographic basis of cinema is coded as “real”, the locus of a truthful representation and the authentic aesthetic experience of cinema. (5)

Films like The Matrix (Andy and Larry Wachowski 1999), with its battle between machines and humans, real and electronic words, and development of digital VFX alongside “antiquated” stunts, sets, and effects,\(^{18}\) emphasise the blurring of analogue and digital, both on-screen and off. Furthermore, as with Cavell’s concerns with cinematic productions as physical structures, where films are ultimately a collection of alternating light and darkness projected upon a screen, Rodowick underlines cinema as featuring “the great paradox”, where it is a “temporal, ‘immaterial’ as well as a spatial medium” (13).

Such a conflation of concepts, especially concerning immateriality, is something Rodowick continues to emphasize when discussing cinema’s difference to artforms that are autographic and allographic. Autographic arts, including paintings, featuring a “signature”, become unique and finished forms once the artist completes said work. Allographic arts, including music, are two-stage artforms that are written/signed but then become performed, and a temporal break occurs between the two. Therefore, there is continuation after their composition that changes the meaning of the artform. When music is performed it can conjure different inflections by those who conduct and perform it, and in the way it is received. Rodowick continues: “The touchstone here is that all temporal and allographic arts lack a tactile substance that serves as the medium for a

\(^{18}\) The most noticeable being that of the infamous “bullet-time” effect, that used an circular arrangement of cameras that took still images to create a tracking movement around an apparently frozen character. It involved traditional analogue still cameras, but combined them with digital software to both plan and finalise the shots. This included simulation software, through organising cameras’ placement and shutter timings, and removing cameras and stunt rigging that supported the actors from finished shots (see Green “Better than SFX”).
permanent and inalterable authorial inscription” (14). Though film captures objects, due to the practicalities of distribution different prints are struck, copies are constantly made, and aspects concerning who is given signatural status are clouded due to multiple production personnel whose artistic impressions are woven into the film’s fabric (Rodowick 15).

The consequences of this are multiplied by digital media because synthetic images “cannot be considered the physical act of the author’s hand, nor do they result in an end product,” as a painting or sculpture do (Ibid.) Displaced in time and space from their initial “performance”, they are notational and allographic – because though displaced, the digital copy will be an original. Thus film, and moreover digital film, becomes a heterogeneous and variable form, constantly open to change. It is, Rodowick states, “a conceptual virtuality, though populated with concrete objects, that varies unceasingly, and therefore, to extract the codes that give this sense narrative and cultural meaning is a process that is, as Freud would have said, interminable” (19).

Therefore, Bazin’s concerns surrounding the world becoming captured and truthfully represented on film, even in a pre-digital era, are difficult to wholly authentic alongside Rodowick’s hypothesis. Indeed, following Cherchi Usai’s proclamations that film is structurally impermanent due to its caustic build, Rodowick proffers the following: “Film, it would seem, is a very uncertain object” (21). This reflects both the build of the medium’s carrier of images (now and then), as well as its ability to absorb and flex in other respects. Yet, as Rodowick himself notes, that films continue to feature concrete objects, shows it’s a vessel that it houses and retains physical attributes. Rodowick’s surmises that, “The solid ontological anchoring of a worked substance is grasped only with difficulty, yielding an art that, so far, leans more than any other on an experience of the Imaginary”, which yields further weight to this chapter’s process of reevaluating the ontological and physical attributes of film (Ibid.). Compositing allows the insertion and removal of certain pieces within the base imagery, and invisibilising portions of the frame interweaves absence and presence. In sum cinema becomes a variable object with no “persistent identity” consisting of “a twofold virtuality” based upon “vertiginous spatialisation of time and a temporalisation of space [and] a peculiar perceptual and psychological instability [of] a doubly absent object” (Rodowick 23).
One such example is Sam Raimi’s *Spider-Man 3*, which features an inordinate level of VFX and compositing, interconnected to traditional photography. In certain sequences, such as the climactic scene, *Spider-Man 3* uses still photographs of locations in New York to build their *mise-en-scène*, blending these highly disparate elements together and replacing the background of the studio, to create one final and absolute image (Figure 3.6). In *Spider-Man 3*, effects personnel used location photographs to create a series of tiles that were composited against another level of CGI imagery, and layered into the blank blue-screened backing of the studio (see Figure 3.7). CGI supervisor Grant Anderson disclosed that his team took shots of every necessary building on each side, and at every storey from opposite buildings. They then used these to build the digital environment with precision, based upon both the detail of the images as well as exacting survey data (Robertson “Triple VFX”). This demonstrates how the concealing basis of compositing can create a shot that generates a sense of realism, but is entirely based upon detached images that inspire a sense of virtuality. The filmmakers, in Robertson’s view, created “a real location with a mixture of photography and CG” (Ibid.). VFX supervisor Scott Stokdyk correspondingly states: “for the final battle […] we were able to go and take real photography of the location, shoot real people there and give Sam [Raimi] the flexibility to do what he wanted” (Desowitz “*Spider-Man 3*: Bigger Arsenal”). Each supervisor here relates the capacity to use
photography, mixed with digital imagery and blended by digital compositing, to produce realistic worlds that are both real and virtual creating a diegetic world whose ontological anchoring shifts and moves between the originally captured objects and those digitally inserted therein. As the climactic scene continues, a series of shots illustrating similar aspects are seen, many of which consistently use wider compositions and a travelling camera. These lengthy shots layer in digital backgrounds, but are partly created from still photographs, which are then mapped onto digitally created geometric framework fashioned by the effects artists and composited together. Stokdyk relates that scenes were fashioned from helicopter footage, HD video and other still photography and live-action shots together with digitally created environments (Duncan “Enemy Within” 111). In this respect the virtuality of film, already existent in analogue films such as *Kane*, *Narcissus* and others is continued and to an extent expanded upon.

This is a striking situation, since it calls upon Kracauer’s discussion of art, and how the cinematic image can be organised in a similar manner to painting. Kracauer saw painting as defeating the cinematic approach, as a reflected in the work of the German Expressionists, who created overtly stylised *mise-en-scène* in films such as *Das Cabinet des Dr. Caligari/The Cabinet of Dr. Caligari* (1920) (39). In Kracauer’s view, *Caligari* ignores film’s basic capacity as a recording medium noting, “films of this type [...] frequently ignore physical reality or exploit it for purposes alien to photographic veracity” (Ibid.). Instead the visuals devolved into a collection of other art forms that destroyed the realistic basis of a film’s diegetic world. Similarly, Bazin saw painting as “always in fee to an inescapable subjectivity” (“Ontology” 7), but deemed the mechanical nature of photography as defeating this human subjectivity, and creating (in Bazin’s view) true realism (Ibid.). This is cited due to the essential nature of the background element used in *Spider-Man* 3, that of a matte painting. A matte painting was a significant tool for the creation and expansion of diegetic representation in cinema, and indeed still is. Yet the development of digital techniques has changed the technique from its earlier form of painting, using oils, acrylics and brushwork upon glass, to digital “painting”, and the use of photo-real elements. Painting was more likely to reflect the personality of the artist, whereas the technology of photography would “not intervene between the world and its image” (Perkins “Film as Film” 29). More classical examples
of the matte painting form feature within *Black Narcissus* (1947), a film set in the Himalayas, but never shot there. Though the filmmakers made a brief foray into forested areas in the UK, most of the necessary locations were fabricated through studio sets, including the dilapidated palace, and a series of “glass shots”.

The glass shot is a fundamental matte painting technique, wherein an artist paints onto a portion of a glass pane coated with a base of distemper, to produce an approximation of a location, such as a building or landscape. Certain portions of the glass are left clear and into this portion a live-action element can be inserted by various means. The technique, used originally in still photography by Oscar G. Rejlander (see Newhall 60 and Rosenbaum 229), was in regular use in cinema from the late 1900s by Norman O. Dawn. This earlier cinematic usage was an in-camera effect, wherein the glass shot was set up ahead of the camera in line with the live-action (Brosnan 21). This allowed the integration of live-action and painting to appear seamless, so long as perspective and distance were correctly calculated. Later developments allowed the technique to be used in various adaptations, including bi-pack printing, rear and front projection and via the optical printer (Rickitt 244 - 265). *Narcissus* makes use of the glass shot in an equivalent manner, as in the scene where the Sister rings the bell at the edge of a precipice (Figure 3.8). The live-action portion of the shot on the left side is composited with a painting of the precipice on the right to produce a final shot. This effectively conceals and reveals the relevant portions of the image, seemingly stitching together physical elements. But, though the shot produces an apparently unified *mise-en-scène*, in a seemingly analogous manner to shots within *Spider-Man 3*, the use of actual painting (as well as its stylised use of Technicolor film) 

---

19 According to Richard Rickitt, Norman O. Dawn’s *California Missions* (1907) is believed to be the first motion picture application of the glass shot (244).
in the former arguably precludes its importance as effecting reality as greatly as *Spider-Man 3*. Whilst both films develop a set of virtual tenets, Raimi’s film’s use of photographic elements within the backgrounds of the climactic scene works to more validly exhibit the nature of the captured world. The scene features Spider-Man teaming up with the New Goblin to rescue heroine Mary-Jane (aka MJ). MJ is trapped in the midst of a high-rise construction site, and Spider-Man has to web-sling his way to her, whilst avoiding the combined efforts of a similarly agile Venom and a monster-sized Sandman. As a climactic event it features probably the film’s lengthiest and most complex sequence of VFX and some live-action, using four digital characters inserted into a series of digital/live action plates, often with the human actors presented as tertiary elements. This produces a sense of purity, analogous to that theorised by Bazin, but taking the ideas in a new digitised direction analogous to *Black Narcissus* and *Citizen Kane*. In each we are seeing a sense of variability, an interplay of ontological and virtual sources, which digital cinema continues to develop using invisibility.

A similar conception is expressed in the shot of Kashyyyk from *Revenge of the Sith* (Figure 3.9). We move in unison with flying vehicles around a series of rocky outcroppings and over a misty alien world towards a slowly revealed beach between a series of enormous trees. This is another good example wherein extraneous *mise-en-scène* of a quite extraordinary and spectacular nature, and outside of what might be viewed as ontologically realistic or natural, is stitched into the final frame via compositing. Though using a 1/8 scale beach miniature (Duncan “New Hope” 88), the Kashyyyk scene in *Sith* also includes many digital traits, such as the foreground CGI flying contraptions, CGI trees and other additional digital elements, which create the necessary fantastical world of the director’s
narrative vision. This in itself shows how compositing makes use of invisibility in order to reorganise the *mise-en-scène*, layering the discrete elements into the frame developing a sense of absence and presence through virtual and real forms.

Ron Brinkmann notes that the basic art of digital compositing is analogous to using a cookie cutter (156). But the cookie cutter technique is one that must operate in a very subtle and complex manner. For a composite to appear successfully within the *mise-en-scène*, it must seamlessly fit within the frame’s construction. In order to do this, the digital compositor seeks to blend fluidly the image layer onto and into the imagery. In addition many effects elements need to match the surrounding live-action environment, by casting reflections, shadows etc. in order to attain verisimilitude within the completed scene. The T-1000 character in *Terminator 2: Judgment Day*, a cyborg that replicates whatever it touches, is often seen as a shiny chrome-like entity during its transformation process, and was often realised via CG animation.

Integration into live-action plates required the aforementioned creation of mattes (Figure 3.10). But, due to its reflective quality it additionally entailed the reflecting of photographs of the surrounding area the character walks through to be bounced back onto its surface (Duncan “Once and Future” 25). Moreover, the glistening surface produced bright reflections and shadows, which also necessitated the compositors

---

20 The technique essentially makes use of a series of mattes, consisting of male and female components, originally conceived in the optical form. The male matte area is used to insert the foreground element into the background. It appears as a black silhouette, and is really a transparent area, into which an image can be inserted. This is placed onto the background via the optical printer, but is left undeveloped. The process is now reversed to create a female matte, wherein the background is now black/transparent. The remaining opaque area of each piece of film allows no further image to be exposed upon them. The final image is created by exposing each of the elements using the optical printer, with each cut out exposing the relevant images into their transparent areas. The relevant mattes enable the set of separate images to blend together, but not to overrun each other (see Rickitt 57).
to input environmental elements, such as heat, smoke and in some instances a heat haze. As VFX supervisor Mark Dippe noted of the shot featuring the T-1000’s exit from an explosion:

Those [reflections, shadows, smoke, heat distortions and film grain] are the kinds of things that are often overlooked in computer graphics – those elements will marry the computer element with the photography. Without them, the computer element would look like a cookie-cutter shape pasted on top of the live action. (qtd. in Ibid.)

Similar inclinations must be adhered to in any compositing if the effect is to be a successful integration of elements. Each time a compositor places a new layer into the *mise-en-scène* the element must be stitched seamlessly into place and this requires the surrounding edges to be carefully muted and made imperceptible (ergo, invisible) and anything that the image interacts with to be similarly adjusted. As Brinkmann notes:

[We compositors] need to be able to control the transparency of the various layers, so that they don’t completely obscure everything they are covering. And we need to have a method that is defining and controlling these attributes that is intuitive and consistent with the rest of the image processing (154).

Often this requires concealing aspects of the frame, at others revealing – but at all stages the compositor must make something invisible in order to make the reality of the *mise-en-scène* ontologically and contextually correct within the frame, the concealing attributes of invisibility allow this to occur.

This highlights how the compositing process produces a conceptualisation of invisibility, replacing portions of the images by concealing unwanted areas, such as a studio background or bluescreen, as in the climax of *Spider-Man 3*. Here, each separate element is blended together, but though the elements lie on individual planes within the shot and the camera itself moves, there is never any unwanted overlapping (see Figures 3.6 and 3.7 for comparison of separate layers). The compositor blends several image
elements together using multiple mattes, fusing together a series of disparate areas. This
alternately conceals and reveals the necessary imagery throughout the shot, in both the
aforementioned scene from Spider-Man 3 and in our initial view of Kashyyyk. At all
times the combination of such discrete image elements - for example the trees, flying
vehicles and other constituent features - are carefully fine-tuned so they fit soundly into
the matted cut-out area. As Brinkmann relates, the practice can involve creating a spline
that literally cuts out the element, creating a matte image at certain keyframes and then
using software to interpolate the changes between them and refining certain intermediate
frames to create a rotoscoped\(^{21}\) image (192 – 195). Another, more flexible and therefore
more useful method that allows complex shapes and motion to be composited involves
extraction of an element from its original area of photographic or digital capture using
techniques based on luminance, chrominance, and colour difference (Brinkmann 206 -
222). This produces images that alternately conceal and invisibilise various parts of the
image and elements and vice-versa. Each element of the Kashyyyk shot is also constantly
moving within the overall image, with the content rearticulated by shifting the various
layers of mise-en-scène over each other as the shot itself moves. Consequently the
concealment and revelation of each new step of the shot as it unfolds allows the apparent
physicality of the mise-en-scène to be reorganised and deployed to create the final world,
which highlights the constant development of Rodowick’s theorisation of virtuality
within the medium.

\(^{21}\) Rotoscopy was originally used in animation, where a piece of live action
photography – most often a performer - was projected onto an animation stand.
Animators then drew around the projected image to create an outline that enabled them to
create a more precise illusion of realistic movement (Konigsberg 338). The technique has
subsequently found its way into visual effects to enable similarly precise cut outs, which
can be combined with other elements.

\(^{22}\) Each of these so-called procedural methods are often combined to extract and therefore
cut out the element(s), most often in the latter technique using a uniform background
such as blue or green that allows the isolation of the foreground image which produces an
“inverted matte” (Brinkmann 215). This matte produces a foreground element that is
black, over an opposite white background. A background matte is also similarly
processed, but inverted to produce a white cut-out hole and a black background that
matches perfectly to the previously created matte. Finally the background plate
photography is incorporated to produce a seamless completed scene and refined using
further techniques to produce an image that more fully integrates into a shot, including
lens distortion, added grain and atmospheric effects.
In order to complete the shot, a number of what might be termed physical elements were incorporated by the compositors alongside other VFX layers\textsuperscript{23}. Often physical effects can be grand in scale, as in the creation of the ice palace from \textit{Dr. Zhivago} (1965) (Figure 3.11). More importantly, in the case of the Kashyyk establishing shot however, is that the shot also consists of non-digital elements. Physical elements are again present but physically recorded imagery is subsequently and substantially manipulated. Perhaps most noticeable is the background plate, originally based upon live-action photography taken in Thailand. This was to be the basis of the shot, but though the footage was apparently interesting, the VFX artists stripped away much of the image. VFX supervisor Roger Guyett felt the rock formations were a good basis, but the effects team incorporated a series of further location shots from China (Duncan “New Hope” 84). Key to achieving the shot’s veracity, its naturalness in the context of the scene, was in reconstituting the elements using extraneous material of both a digital and physical nature. This included the aforementioned CGI trees, but additional photographic elements from China and, moreover, a practical tree model and separately shot smoke were also integrated to create the planet’s overall misty environment (Desowitz “\textit{Revenge of the Sith}: Part 2 - Digital Environments”).

All of these elements are, in Guyett’s words “stuck’ together in the final composite using a system called Zentropa” (Duncan “New Hope” 71 and 85). Zentropa allows effects artists to project 2D images into matte paintings, creating a 3D environment, and these images remain in place and conform to rules of perspective even when the camera moves, as in the Kashyyk scene. This process builds up layers, from

\textsuperscript{23} Physical elements in special effects are those that are organised from components of a physically substantial nature. These might be models, such as buildings, or atmospheric effects including rain, mist, and physical set dressing, such as fabricated snow or ice.
digital elements, models and photographs, to produce a textured piece of *mise-en-scène* that is partly digital, but also based upon natural environments. This begins to present the collective *mise-en-scène* in such a shot as creating a realistic, natural, and moreover physical looking world, produced via several physical and non-physical elements. Kashyyyk, like Spider-Man’s Manhattan, is an essentially digital world, yet it also results from reference material from a natural environment.

As Guyett notes of the work in *Sith*: “it is always best to start with some kind of reality, no matter how much you eventually change it” (Duncan “New Hope” 84). The work of Guyett and fellow VFX artists in films such as *Sith* is arguably often carried out with similar sentiments in mind. By using software tools, such as Zentropa, VFX artists and compositors work to successfully map elements of various forms into a frame in order to create the necessary *mise-en-scène*. Such endeavours are, as noted, most often based upon making certain portions of the frame invisible in order to create the final visible composite. Habitually, as in the case of the Kashyyyk shot and indeed by virtue of the medium, the composite is a moving entity – part of the unfurling of the moving picture. This sense of cinematic movement is a necessary given for the “realistic tendency” that Kracauer holds dear within films (“Theory” 33) and can be seen in the travelling shot from *Sith* and within the climax of *Spider-Man 3*. Any shot must adhere to such rules in order to pass a spectator’s scrutiny, with the concealment of the join between the different elements brought together. In the Kashyyyk shot, such rules are successfully adhered to. Consequently, the shot in question, alongside *Sith*’s first shot (as discussed earlier) consistently manages to seem contextually realistic. Each element’s lighting, texture, weight, surrounding atmospheric effects, colour, and so on, are all successfully merged together. As Brinkmann says:

> By far the most difficult part of this digital process is producing the integrated result – an image that doesn’t betray that its creation was owed to multiple source elements. In particular, we are usually attempting to produce (sequences of) images that could have been believably photographed without the use of any postprocessing. (2)
This highlights the capacity of the compositors to take apart and recombine the constituent parts of a shot in order to construct the world more accurately and realistically than if such tools, techniques and artistry had not been used.

Moreover, these shots often “seize upon physical reality” (Brinkmann 34) even as they reside within and orbit the digital realm. By doing so, they echo something of Kracauer’s conception of the real – the use of the physical setting, specifically the soundstage, and the necessity of authenticity. Reality’s capture, in Kracauer’s view, is produced by the use of staging, of both the action and, more importantly, of the environment. Furthermore, Kracauer calls for the environment to be as faithful to the real world as possible (“Theory” 33.). It is interesting to note once more that VFX and compositing are often used to create worlds that seem to be most unreal: alien worlds (such as Kashyyyk), and fantastic feats (by Spider-Man). Yet in each case the films’ worlds and characters’ feats are painstakingly created to adhere, in certain respects, to some sense of realism. The creation of Spider-Man himself is a good example of this. Though clinging to walls and moving acrobatically through space on a strand of web is spectacular and fantastic the VFX artists took care to ensure the physics used were both consistently uniform and, by degrees, realistic. Though a 3D CG model in many instances, director Sam Raimi stated he sought “to ground the fantastic Spider-Man in the real, physical world, even in his CGI form” (Duncan “Enemy Within” 84). Consequently the effects artists drew upon live-action reference material in order to insert the animated Spider-Man figure into the real world (Ibid.). Visual effects artists John Schmidt and Gregory Nicholson used a physics tool in order to map out the correct determinates for any movement the character might make (Ibid.). So, for example, when Spider-Man hurls himself through the air in order to escape Harry Osborn during a chase sequence early in the film the effects artists use the software to check whether their animation would match the actual start and close of the character’s movement if carried out by a real human (albeit one with super powers).

This attendance to a sense of the real world and its physical laws is something many comic book writers and artists have ironically gauged and used in the original publications. Indeed, authors have documented and critiqued superhero origins and subsequent characteristics of their world as featuring a sense of scientific realism within
the fantastic milieu. Though critical of much of Spider-Man’s abilities, authors Lois Gresh and Robert Weinberg highlight that one of Spider-Man’s abilities – that of wall climbing and clinging – is consistent to the spider. They point out that, “Only hunting spiders have a thick group of hairs known as scopula between the claws at the end of their legs. Each hair is made up of thousands of microscopic filaments that are covered with moisture and make it possible for them to stick to surfaces” (73). In their reading of Stan Lee and Steve Ditko’s creation this piece of the spider’s physiology, alongside their body’s finer hairs, bristles and spines called setae, which pick up changes in air current producing “spider-sense”, synchronise with Spider-Man’s own powers (Ibid.) It is this sense of diegetic realism – a realism that fits within the comic-book and latterly cinematic version of that world – that the VFX strives to attain. By using effects not only for fantastic feats but also for realistic, truthful and believable ones, Spider-Man plus other fantastic characters and worlds, manage to connect with audiences who can arguably more openly suspend their disbelief.

James Kakalios, author of The Physics of Superheroes, similarly – but more positively - outlines the importance of scientific accuracy in creating aspects of superheroes like Spider-Man. He remarks that certain aspects of Spider-Man strongly echo aspects of real-life physics and physical aspects of the character’s progenitor, the humble spider and other real-world creatures, including climbing. He highlights Peter Parker’s first foray into climbing up a wall in Sam Raimi’s Spider-Man (2002), where we see a microscopic close-up of fibres extending from Peter’s fingertips is consistent with that of the gecko (Kakalios 202). Kakalios explains gecko lizards are able to climb smooth surfaces due to millions of similar fibres (setae) protruding from their feet, which

---

24 As IMDB user dangkoen says:“You actually care about both the hero and the villain (+ of course [sic] the supporting characters), the nonsense they have to take throughout the movie and their eventual clash coming to and [sic] end. Later Batman Begins would use the same formula to great success! [sic]” (“This film is so genius”); similarly Francis LaLonde on rottentomatoes said: “The effects actually did make it seem like Maguire/Parker had spider-powers (unlike the original "Superman", which I, for one, did NOT believe a man could fly) [sic]” (“Spider-Man Reviews”).
produce a static charge that enables them to cling onto the surfaces. Though Kakalios establishes the lizard’s setae are electrically neutral he goes on:

The electrons in the fibres in the gecko’s toes [which can hold both a positive and negative charge] are constantly zipping around. Sometimes a few more electrons are on one side of the fibre, making that side slightly negatively charged, while other times a few electrons are on that side, making it slightly positively charged. If the side of the fibre closer to the wall is, just for a moment, slightly negatively charged, then it will induce a slight positive charge in the wall (by repelling those electrons in the wall closest to the surface, exposing the positively charged electrons) and an attractive force between the fibre and the wall will result. (Ibid.)

Though the force produced is quite weak, Kakalios highlights that contact by many millions of such fibres would enable the force (known as van der Waals force) to hold the weight of a lizard and, if similarly endowed and scaled up, Peter Parker. Certainly the VFX shot which shows fibres extending from Peter’s fingertips (achieved through the use of CGI) follows on from the reality of certain spiders and – more likely in this iteration - the gecko’s ability to cling. Furthermore, his accentuated reflexes – most often seen in a CGI produced Spider-Man, aspire to strongly reflect physical reality.

Which leads to Stephen Prince, whose examination of CGI VFX within cinema makes a similar case for the interpolation of a certain type of realism. His article “True Lies: Perceptual Realism, Digital Images, and Film Theory”, lends credence to a series of different ways of seeing cinematic realism. Prince notes that new modes of interpretation must be enacted in dealing with the flood of digitally created visuals appearing in the late Eighties and early Nineties. He goes on to state that the creation of CGI establishes “credible photographic images of things which cannot be photographed” and is seen by Prince as challenging the traditional assumptions surrounding realism (Prince 28). As a consequence, the CGI used to create Spider-Man’s fantastic flips, his movement and ability to hold onto a wall follows Prince’s arguments surrounding correspondence-based models, which should be positioned to account for imagery that is both “real and unreal” (31). These models are based on what Prince defines as a series of “iconic and noniconic
visual and social cues that are structured into cinematic images in ways that facilitate comprehension,” which allows seemingly impossible things (such as Spider-Man) to be depicted according to the laws of physics (Ibid.). By using such cues viewers are enabled to justify what they are seeing. Prince sees viewers already doing this when watching motion pictures, by recognising qualities that are similar to the real world, such as “monocular distance codes” and contour information (Ibid.). But at the level of VFX the idea goes further, allowing cultural, social and other extra-diegetic experiences to be brought to bear upon the visually perceived images. When watching Raimi’s interpretation of the comic-book hero, it’s necessary to build a perception of the world and its characters based upon the comics and its characters capabilities, as well as the real world that it adheres to. Or, as Prince surmises: “[W]e can ask about the kinds of linkages that connect the represented fictionalised reality of a given film to the visual and social coordinates of our own three-dimensional world” (32).

Following this through to Spider-Man, similar conclusions can be made when examining the capacity of that superhero’s passage through space. Kakalios examines the death of Gwen Stacey from the comic Amazing Spider-Man No. 121 (June 1973) and the heroine’s untimely death due to physics. Though Spider-Man attempts to halt Gwen’s fall by lassoing her with webbing after she’s been thrown off a bridge, the Newtonian law that prohibits his leaping highlights how Gwen dies, as well as producing a later, secondary and more positive outcome. In essence Gwen dies because her sudden deceleration is too much for her body to sustain and her neck is snapped. Rather than the gradual absorption of force that a car’s airbag and seatbelt provides passengers in absorbing energy, the elasticity of the webbing attached to Gwen doesn’t have enough time to perform a similar action to that of the aforementioned car safety components. The webbing’s sudden snap is repeated within Gwen’s own body and skeleton. Yet, though the outcome of this storyline was tragic, the writers of Spider-Man Unlimited No. 2 (August 1993) returned to the problem, which saw Spider-Man save a falling workman. Instead of relying purely upon his webbing to grab him, Spider-Man hurls himself off the skyscraper and uses the greater velocity of his propulsion to catch up, grab him and subsequently use the webbing to swing them to safety (see Kakalios 54).
In Kakalios’s words – Spider-Man’s “superior strength” and the webbing’s elasticity, plus the arc of the swing, manage to save the workman. Rather than solely relying on the webbing’s interaction with the workman’s skeletal structure and body parts, which would cause the same consequences as in *Amazing No. 121*, the more gradual use of deceleration, combined with the swinging arc of their passage allows the superhero (and the laws of physics) to win out. Kakalios notes the scene was imported into the first *Spider-Man* film (2002), where Spider-Man catches up to Mary-Jane and saves her in a similar manner after the Green Goblin pushes her off a bridge (Ibid.). By using such laws the filmmakers observed a sense of reality that followed the use of real humans in performing stunts, even though much of the action involved digital effects. A similar set of conditions are therefore applied in order to maintain consistency as well as obeying physical laws within other scenes throughout the *Spider-Man* film series, including the fight with Harry Osborn’s New Goblin in the third film. Though the filmmakers strove to impart a sense of excitement and drama, the physics laws applied also played a strong part in sustaining the work of the effects. Moments like this are both realistic as well as fantastic and continually echo Raimi’s previous words: grounding Spider-Man in a real, physical world.

But, though the ontologically realist tendency is present – often along with actors, sets and other physical elements - the filmmakers continually use digital elements to supplant and augment the basic tenets of the captured non-diegetic real world. As with Rodowick’s own awareness with the virtuality of film, Laura Mulvey writes of the impact of the digital within cinema and filmmaking, and how it has partly changed and distorted the form. There is, writes Mulvey, an uncertainty within filmmaking that distorts notions of indexicality within even analogic photography. Drawing upon C.S. Pierce’s semiotic system that sees an icon as a recognisable sign that refers to the “thing”, Mulvey highlights however, that “an index […] is a sign produced by the ‘thing’ it represents. An indexical sign must be recognizable through similarity, as for instance, in a footprint, and thus have shared qualities with the icon” (“Death” 9) Though Mulvey states something must leave a trace, or mark, of its physical presence form that time – as in photographic negatives and positives – the film medium is beset by other secondary iconic and symbolic signs that overwhelm the initial one (Mulvey “Death” 11). Because there are
constant shifts, both in the original capture and in the technological shifts, Mulvey (as Rodowick) sees a new kind of ontology emerging. No longer is there a direct binary system, where reality conflicts against fantasy, or fiction versus document; there is now an “ambivalence, impurity and uncertainty [that displaces] the traditional oppositions” (“Death” 12).

With the arrival of digital technologies Mulvey construes an analysis that once again showcases the change between antecedent and new media. Mulvey states: “The specificity of cinema, the relation between its material base and its poetics, dissolves while other relations, intertextual and cross-media, begin to emerge” (“Death” 18).

Though cinematic reality (indeed realities) still arguably exist(s), Mulvey surmises “the digital, as an abstract information system, made a break from the analogue imagery, finally sweeping away the relation with reality, which had by and large dominated the photographic tradition” (Ibid.). But, Mulvey also stresses the continuance of existent films and how “the old converge”, in new distribution systems such as the Internet and DVD, which leads to “The aesthetics of the past meet[ing] the aesthetics of the present, bringing, almost incidentally, new life to the cinema and its history” (“Death” 21).

Mulvey sees this transforming how films are consumed, but it easy to see the same arguments transposed to production, particularly with regards to the development of compositing and the position of VFX shots within live action films. VFX artists’ and compositors’ work is inserted into shots in combination with backgrounds taken from both digital and live-action sources, with the compositors continuously making the various areas into which the elements are inserted essentially invisible, concealing what is unnecessary. This compositing has to be both as seamless as possible within the context of the film, and the shots themselves should also appear as contextually realistic as possible in order to repeatedly convince spectators of a shot’s significance. But though it could be argued the invisibility at work might aim to remove the pre-existing analogue processes, images and realisms that have been in existence for decades, Mulvey’s argument that “cinema, rather than simply reaching the end of its era can embody a compulsion to look backwards, to pause and make gesture to delay the combined forces of politics, economics and technology”, seems fitting to explore the technical processes and form of the medium itself. She conjectures:
In opposition to a simple determinism inherent in the image void between the ‘before’ and ‘after’ of an era that had suddenly ended, the cinema provides material for holding onto and reflecting on the last century’s achievements as well as learning from its catastrophes. (Mulvey “Death” 24)

From this stance Mulvey presents Godard’s *Histoire(s) du Cinéma: Toutes les histoires* (1998), which reflects cinema’s changes during the 1980s and 90s. But beyond this single polemical film it is possible to see *Spider-Man, Sith* and other VFX heavy films as exhibiting similar thematics to Godard’s film even if they are produced in quite different production contexts (i.e. one’s an example of mainstream genre cinema, the other the work of an experimental *auteur* working within the realm of avant-garde or what might broadly be referred to as art cinema. Whilst Mulvey notes Godard’s film – a mix of celluloid and video and various aesthetic choices – as an inscription of (cinematic) history, as well as raw material for reflection and contestation, so too can the VFX films in question here. Of course, chapter one has already shown how the development of digital technology often forces a remediation of the textual content, and such films also show us how old and new are smashed together. *Sith*, so heavily reliant on greenscreens to allow the incorporation of digital backdrops also still relies upon the incorporation of all too human performers alongside digital brethren. Similarly the use of photographic plates, locations and actors with digitally constructed stunt doubles, characters and augmented locations highlights a constant evaluation of then and now. Whilst there is often self-professed cutting-edge technology in use by directors the films still exist as cinematic artefacts that use techniques, styles and forms that have been around for years, being refinements of comparable analogue techniques. As a consequence, though digital techniques aim to create synthetic elements as an aid to telling certain narratives, creating films that aren’t necessarily hinged upon binary oppositions (real/fantasy), and more seamlessly integrating them, new digital media can be seen as always linked, if not in fee, to existent cinematic techniques and types of realism, such as Bazin’s.

Indeed, in Kracauer’s view any staging created must not be removed from reality, as for example a painter’s style, which might stylise his or her view. As Kracauer goes on
to observe, if the raw elements of imagery are replaced by “the gist of it”, the overall
diegesis is disturbed (Kracauer “Theory” 34 – 35). What Kracauer insinuates by this is
that if a film’s visual aesthetics were outlandish and highly fantastical – with significant
stylisation as in a CGI animated film - they would be as unreal as (in Kracauer’s words) a
Cubist painting. But with a referential basis in the real world, using more detailed
texturing, reflective lighting and other visual cues and animation that reflects realistic
movement a piece of CGI will more fully confer to the real world, rather than generating
an essence. Indeed, even within CGI animated films, such as those produced by Pixar,
this can be seen. Take for example the Toy Story series (John Lasseter and Lee Unkrich
1995 – 2010), and compare them with the first half of Andrew Stanton’s Wall-E (2008).
Though each is undeniably a CGI animated production, Stanton’s film might be seen as
bridge between the animated “toon-ness” of Pixar’s first feature film and the use of CGI
within a live action film, where the onus is often on creating locations, buildings and
mechanical objects that satisfy realistic tendencies expected within the real world. Wall-
E’s first half is a far more realistic interpretation of (a rubbish-strewn) Earth than the
more cartoonish Toy Story franchise. Textures, atmospheric elements and lighting
generate much more realistic qualities than those that feature the toys of Woody and Buzz
(even in the more recent film, which enables a more sophisticated use of technology to
render textures, lighting and the use of human characters). Though it can be argued the
stylised nature of Toy Story is purposefully designed to be more cartoon like, following
un-spoken rules about what an animated family film should look like, and it is an earlier
technologically nascent production, many of the same rules (save technology) could be
impressed upon Wall-E.

But, in Wall-E, the producers strove to build a much more physical basis, even
basing their cinematography on Panavision 70mm cameras used to photograph many
science-fiction films of the 1960s and 70s (Stanton qtd. in “Wall-E Production Notes”
16). Using the actual cameras to shoot test footage, and asking the advice of live action
cinematographer Roger Deakins, the animators learnt how the rudiments of lens
distortion, the imperfections gathered by those lenses and other live action anomalies
captured in raw footage could be replicated within the digital animation (“Wall-E
Production Notes” 28). This provided what producer Jim Morris saw as more like a photographed image, as he says:

The result feels like there was a cameraman present, as opposed to being in some sort of virtual space where everything is pristine. There’s a bit of imperfection in the look of the final film that adds to its believability capturing a more quantifiably real world rather than the virtual world seen in previous productions. (Ibid.)

The resultant look of the film, though animated, attains a verisimilitude that is quite noticeably realistic, in terms of solidity of the ground that Wall-E moves across, the attention to atmospheric elements such as dust and rubbish that flits through the air and the wasting concrete edifices of the buildings and rusting metallic elements.

In her evaluation of Wall-E alongside Toy Story 3, Colleen Montgomery situates the films as highlighting and championing the “disused, archaic and obsolete technologies over their digital successors” (7). Though sophisticated digital technology is used to fashion them, she argues the films are always in contradiction, espousing a sense of love and importance to the archaic, outmoded characters within. Woody, Wall-E and his junked-up Earth, and the small town gentility of Cars (John Lasseter 2006) critique the digital retooling of labour and the world and its population’s envelopment of technology. Montgomery notes Wall-E continues this sensibility, since while the rusty robot does his best to clear up the wasteland of Earth, the population sit on board an automated spaceship, becoming obese and disengaged from organic life. A technological cocoon is created that digitally sequesters their bodies, leading to boundaries between “the biological and the digital” becoming blurred (Montgomery10). More alive than the humans, and even the more advanced EVE, the old and “out-dated” Wall-E has a more physically active, endearing nature, and a fondness for the Earth he strives to reclaim and the bric-a-brac he collects there. Though characterised as an “obsolete machine”, the little robot nonetheless salvages numerous objects, and ultimately the humans he encounters on-board the spaceship - producing a more biological and favourable life that points to a more hopeful, pre-digital and industrial time.
Montgomery sees *Wall-E* as a “virtual repository” where, “abandoned, anachronistic cultural artefacts are resurrected and preserved in a form of digital archive”, which can be enlarged to incorporate the aforementioned visual style (11). Not only does Montgomery’s critique show the film striving to regain an abandoned culture, encouraging us to believe in Wall-E’s recycling, and reclaiming a more salutary life, but the visual style also links us back to older analogue filmmaking techniques and methods. Stanton’s film becomes an apparently anachronistic pantheon, displaying a series of outdated, outmoded and obsolete aspects of filmmaking and cinema. Though still “virtual” *Wall-E* is also dutifully and lovingly using older styles and systems to produce a world that seems concrete. Showing us a rough, dirty world, it arguably continues Bazin’s maxim that cinema has a need to lay bare reality through the lens and capturing the ontological substance of the world, even though they are virtual. Bazin maintains the creative impulse of the impassive lens strips objects of “spiritual dust and grime with which my eyes have covered it”, before continuing: “[It presents] it in all its virginal purity to my attention and consequently to my love. By the power of photography, the natural image of a world that we neither know nor can see (‘Ontology’ 15). Though not analogic per-se, Bazin’s precepts of stripping the world bare can be seen carried through here, with the digital cleanliness and enmeshed technological virtuality becoming critiqued and subdued by the inclusion of Deakins’s advice and the incorporation of the Panavision camera lens aesthetics. As the film in general manages to reveal greater intimations of digital and physical/human interaction, the film’s visual style also managed to highlight “animation’s recuperative capacity to operate as a form of digital archive for the cultural/material artifacts rendered obsolete by ‘virtual realities’” (Montgomery 7).

A live action film that uses some actual elements of real bodily objects and elements, such as Clint Eastwood’s *The Changeling* (2008), integrating digital structures and people, also forcibly creates a sense of reality through digital means. Set in the 1930s, the film follows the plight of a woman whose son is kidnapped. Though apparently found by the police, the mother is mortified to discover the boy is not her son and struggles to get the authorities to admit to their mistake and to find her real son. One particular shot, where the protagonist visits a police station in downtown Los Angeles
made use of both a live action foreground shot, incorporating actors and some 1930s cars, but married this to an extensive digital backdrop. This digital element, which shows a large number of buildings, further vehicles, as well as crowds of people and other atmospheric elements such as matching daylight and shadows, was imperceptibly matched to the “real” foreground. It has all the necessary weight, character, and physical impetus of the cars and physical performers. It also conceals the bluescreen used to add the digital element and manages to use a digital element that has no physical weight or concreteness to fully instil the necessary reality of the film.

It is therefore arguably justifiable to locate VFX and their compositing as much as actual sets and locations within the *mise-en-scène* as these are “studio-built settings”. Therefore they too should (and justifiably do) “convey the impression of actuality, so that the spectator feels they are watching events which might have occurred in real life and have been photographed on the spot” (Kracauer “Theory” 34 - 35). Though one might reasonably argue they are still edited into the shot, something Kracauer feels breaks down the objectivity of the imagery, the often non-physical - but physics-based - CG elements of Spider-Man’s integration are arguably blended so as to appear as naturally apparent as Aunt May’s expository conversations with Peter Parker.

A more extravagant, but no less important, connection with the use of staging and realism can be seen in a further sequence within *Spider-Man 3*, during a chase/fight sequence between Spider-Man and the New Goblin/Harry Osborn. Another relatively long sequence, the scene follows the two adversaries in a chase over and in between a series of New York streets and alleys. Fabricated from a series of very different VFX techniques and image capture, the scene demonstrates a creative use of invisibility by the effects artists and compositors, underlining their use of physical and digital practices. Again, the scene combines digitally manufactured backgrounds with a series of still photographic data in order to build up the structure of the shot. But in order to complete the scene the VFX team also built upon previously used techniques of digital doubles, alongside live-action performance by actors Tobey Maguire and James Franco.

The digital double is often employed by filmmakers in order to generate risky or impossible stunts within scenes and involves the creation of a digitally animated character that resembles the on-set performer. As Jody Duncan notes of a chase sequence
in *Star Wars Episode II: Attack of the Clones* (2002) “Digital Doubles of all the leading characters were employed as a means of realising fantastic stunt scenes, without time-consuming, potentially dangerous and limiting set-ups” (Duncan “Love & War” 76). Modellers took head scans of the relevant actors and together with photographic data of their real bodies built up digital versions (Ibid.). This allowed death-defying leaps by the characters from high altitudes, such as Anakin Skywalker’s jump through the skies of Coruscant and a fight between Jango Fett and Obi-wan Kenobi (Figure 3.12). The scene used techniques that allowed a greater flexibility for the filmmakers where they could stitch into place digital stuntmen in order to complete the scene. In Barbara Robertson’s article she interviews animation supervisor Rob Coleman whilst he watches the Fett-Kenobi fight, and his words highlight how intermeshed digital and live action elements are, as well as how invisible the difference between them is. Coleman states:

[S]ometimes they're digital. It's impossible to tell. As the scene plays on his monitor, Coleman speaks as rapidly as he can while pointing to the moving characters on his much-fingerprinted screen, ‘They're both real, everything else is CG. He is real, nothing else. He's CG. Only Obi-Wan is real. Everyone is CG. Everything is CG. He's CG. He's real. He's CG. He's real. He's real. That's CG. That's CG. That's all real. He's CG, he's CG, he's CG. That's CG water”’. (qtd. in Robertson “Clones – 06/02”)

By using the digital characters, which are in effect virtual elements from a computer, Coleman was able to produce the necessary fights and stunts through a blend of real
actors and digital effects which, as Coleman’s quotation shows, proves difficult to distinguish between. It is an amalgam of digital elements that are both not physically present, held unseen within the hard-drives of workstations, and yet still present in a digitised form. This blending of elements followed Lucas’s decision to create the fights on a similar level to the rest of the film, matching reality and digitality in order to reach the necessary level of verisimilitude, as well as expediency (Ibid.). Such methods allowed the filmmakers to work around certain problems that might beset them in organising and shooting such a scene - saving time, money and avoiding inherent dangers. Theoretically, the use of digital stuntmen also produces a more dynamic and dramatic fight; staging a sequence that requires actors to be situated on the ground would produce a fight that would be less exciting to watch. The radical changes in Jango Fett’s flight and Obi-Wan’s own movements rely on the incorporation of digital doubles in order to produce a more integrated sequence. To stage the shot with just actors and stunt doubles, would need cables to move them through the air, crash mats to protect them and necessitate a lot of cutaways, and shorter shots to make it as elevating to watch. But using the digital elements means the filmmakers can do more, and more quickly, with less resort to extra safety precautions and without cutting the action, which can be of benefit to a filmmaker. Furthermore the implementation of digital elements means the sequence can be staged more in depth than through disjointed cutting, corresponding with Bazin’s theories of cinematic purity.

In the case of Spider-Man 3 a similar feat was used, building upon work that generated the previous instalment’s Dr. Octopus. The filmmakers used the “Light Stage System”, utilising synchronised strobe lighting to illuminate the actor and four cameras to simultaneously circle and photograph the actor’s face hundreds of times to record multiple images (Duncan “Enemy Within” 85). This data was then used to build up realistic skin textures for the Octopus character and a similar process was used to record Maguire and Franco to create part of the unmasked Spider-Man and the New Goblin fight scene. This allowed the scene to appear realistic, producing another sense of perceptual realism where the precepts of the real world link to those of the cinematic. Furthermore it also allowed an uncompromising stance in the creation of the dramatic stunts and action,
where the physicality of the characters is broken down and mapped onto a digital framework.

Already we can see how the VFX artist breaks down the physical reference material of the performers (i.e. photographic record of their bodies taken from prior sources), as they move to translate the features of Maguire and Franco from photographic capture into digital data. This data, by virtue of its being made up of numerical code becomes practically invisible. Lev Manovich outlines digitisation of objects, such as photographs and other objects that are previously continuous forms – forms that have no apparent indivisible units from which they are composed – into numerical data via digitisation (“Language” 49). Manovich continues:

Digitisation consists from [sic] two steps: sampling and quantisation. First, data is sampled, most often at regular intervals, such as the grid of pixels used to represent a digital image [and then] each sample is quantified, i.e. assigned a numerical value drawn from a defined range. (Ibid.)

Sampling the continuous structure of Maguire and Franco’s physiognomy is performed by the digital camera that circles them which then quantifies the physiognomy into discrete (that is non-continuous and separate) elements that take up virtually no physical space. That makes such data on a physical and spatial level incredibly small in relation to previous analogue forms that rely on mechanical parts or physical structures: hence digital data becomes absolved of virtually all of its spatial properties; it is concealed, and invisible to the eye. It still needs to be stored, but the data itself – made up of ones and zeroes - is virtually unseen.

Consequently, the digitised faces and physical properties of the actors in Spider-Man 3 are restructured though software and hardware in the hands of animators and effects artists and ultimately reconstituted into the visualised form of a digital double. But a further step in the use of the digital double was taken within Spider-Man 3, where this capture of data and use of a digital double was further amalgamated with other physical attributes. Like other scenes previously discussed, the chase sequence relied upon fabricating actions and locations that were a negotiation between the natural and physical
world and its contents that may make up the *mise-en-scène*. Indeed, though digital
doubles were used in creating the often death-defying drops, swings and gravity defying
movements, additional elements were used on top of the digitally created flesh tones and
textures. Of these the most prominent is the inclusion of actors’ faces projected onto the
respective digital double. As effects supervisor Stokdyk relates, “Sam [Raimi] would
direct the actor through all the beats of the shot and get the real actor’s face; and then we
would use that photography as a face replacement element” (Duncan “Enemy Within”
110).

This projection process is further merged with both the digital doubles and actual
live-action performances of the players suspended on wire rigs and motion-controlled
platforms. Again, we see invisibility at work, with the respective image of the actor
mapped onto the architecture of the digital double which positions the digitised face of
the actor into a previously blank space within the frame in order to build up the shots’
structure. The facial sampling conceals a vacant space within the frame, similar to a
digitised clothes-dummy’s head, inserting an electronic form that appears to replicate the
skin, hair and other details of the person’s face. In addition, the use of the 2D “virtual
cards” (also called tiles by Spencer Cook in Robertson “Triple VFX”), allows the
filmmakers to capture the facial performance and then place them into the 3D
environment of the shot, similarly concealing pieces of the background (Duncan “Enemy
Within” 87 – 91). The photographically captured images of the actors in 2D were then
animated in a 3D environment, moving back and forth, up, down, and left and right in
order to facilitate further realistic movement within the scene (Robertson “Triple VFX”).
This combined work illustrates how compositors pull apart the fabric of the *mise-en-
scène* in order to re-unify the physical attributes. Moreover the seamless integration
achieved begins to point out the necessity of adjusting how we observe and perceive the
seeming reality of the shot.

With such techniques we are seeing a fantastic enterprise comprising the *mise-en-
scène*, yet despite the fanciful and spectacular action, the staging and use of physical
attributes all manage to produce a contextually realistic, internally consistent world. It is
not that Bazin, Kracauer and others’ views of *mise-en-scène* are intrinsically wrong, but
that their approach in a modern age of cinema must be adapted and modified. As John
Gibbs notes “[Mise-en-scène ] encompasses both what the audience can see, and the way in which we are invited to see it” (5). Gibbs makes the worthy point that we engage with what is both presented to us and how it is presented. Thus far I have argued how the invisible layers of compositing and the surrounding elements of effects are used. In the final section I will explore more fully how these systems exist within modern cinema. I will investigate how, as spectators, we must aim to perceive digital compositing and effects fluidly and with new principles of perception. Therefore it is important to note that the differing visual cues developed by filmmakers for building a film’s images should also be reflected by new critical and academic discussion surrounding them. But what will become evident is that these cues also respond to Bazin’s existing theoretical concepts.

**An order of Perception.**

The placement of *mise-en-scène* in creating realism within a film’s length as observed in previous sections does not have to be based solely upon the physically present, or that it be a continuous and unbroken shot. Digital compositing and digital effects allow filmmakers to “edit” into shots new material that is drawn from a digital file. Though André Bazin asserts that the creation of “true realism […] is to give significant expression to the world both concretely and in its essence”, he neglects to discuss the impracticalities of his methodology (“Ontology” 7). While photographic imagery offers a mechanical record of the world it is not without human interaction, even if to Bazin it finally seems so (Ibid.). Theorists must always be aware of the illusionism of the cinematic art and the processing required by technical personnel after the shutter has been released and the film winds on.

Critics such as Rodowick have highlighted how film is a virtual medium, prone to different meanings and incorporation and creation of intangible aspects as well as tangible. In addition as Mulvey has shown, the medium is seen as being able to incorporate antecedent and apparently out-dated aspects of film, which highlights a more polyvalent and multifarious development of ontological bases. There is manipulation of imagery through development and processing after filming, but even within the midst of
scenes being photographed the camera operator often reframes, refocuses and moves the camera in order to capture the performers in both analogue and digital production. In addition, the performers themselves are not merely posed, but manipulated by their director, or by their own thoughts concerning the character, narrative and so forth. Perhaps due to his personal interests, or the period of cinema that he was able to view (up until the 1950s), Bazin’s viewpoint of what constitutes cinematic imagery may have compromised how he analysed cinema. In “Ontology”, Bazin notes the importance of physicality as the benchmark from which the Ancient Egyptians sought remembrance, and the continued but modified representations through likenesses created via painting and photographs (“Ontology” 4 – 6). Though Bazin notes the changes in representative media, his core assertion is that the photographic nature of film produces a more truthful and objective representation (Ibid. 7). Rather than the subjective qualities that issue from an artist personally adjusting colour and style within painting, and indeed the subjective directions of filmmakers, for Bazin film and photography’s technology removes the subjective personality far more due to the automation. It is this that changes our psychological connection with an image (Ibid.).

Yet, despite these apparent inaccuracies, Bazin’s viewpoint of realism can be seen as sustained and genuine, even within the realm of modern, fantastic cinematic representations, albeit modified. Bazin himself notes that there have been changes in the way man has been represented over the centuries – from actual mummification through painting, to photography and now cinema. Though Bazin could not see beyond his lifetime, through writing articles, such as “The Myth of Total Cinema”, he aimed to do so. As previously noted, Bazin saw cinema’s potential to be a total and complete art form as yet to be achieved. He continues:

The cinema is an idealistic phenomenon. The concept men had of it existed so to speak fully armed in their minds, as if in some platonic heaven, and what strikes us most of all is the obstinate resistance of matter to ideas rather than of any help offered by techniques to the imagination of the researchers. (“Myth” 17)
Though inventors and users therefore saw cinema as “total” (Ibid. 20), Bazin is clear that this is a myth; that in fact the totality of cinema as a complete form has yet to occur and that it is necessary to go ever forwards. For Bazin cinema in effect has “yet to be invented” (Ibid. 21). Arguably, though he is critical of certain instances of cinematic techniques (such as editing), Bazin acknowledges cinema’s forward technical advances do draw it towards a totality. At the same time, such a theory might suggest that cinema can never attain this totality, since technology is always evolving. But consequently, the development of digital compositing and VFX effectively translates many of Bazin’s ideals, including totality, as well as the uses of concreteness and unity, even as it challenges them.

Images, such as those used by Spider-Man 3, which overtly use digital technology, take cinema considerably further forward than the mechanics of 1950s filmmaking. It allows the creation of overtly stylised aspects that are physically “absent”, but visually apparent; but simultaneously the developments allow a convergence of elements within the same frame, producing shots that efface noticeable cutting between them and other images. Bazin was only able to see so far, so his ontological theories require modification and adaptation if they are to be applied to contemporary digital filmmaking.

Stephen Pattison has noted that there are differing ways of seeing the world and its contents, and that these “scopic regimes” often overlap and exist in parallel to the supposedly dominant order (30). Whilst society might view the material and psychological bases therein, other seemingly atypical (or in Pattison’s words “deviant”) regimes are present and contest the “normal” bases of reality (Ibid.). These include dreams, visions and other examples of perception which are not strictly realistic, but which can play an important part to the “seer” in forming their current world and its contained meaning. Pattison presents sight and vision as “a series of informed, selective predictive hypotheses about reality based on past knowledge and experience” (29) This presents an interesting notion, with the argument against perceiving the world along lines of one singular bearing able to be inserted into my discussions of mise-en-scène and compositing.
As noted, the technique of compositing allows a series of discrete elements to be layered into a shot, building concrete unity. Moreover these layers are not merely digital constructs, but also feature physical pieces of *mise-en-scène* which are built into the shot, including performers, other settings and the creation of associated units, such as atmospheric phenomena. Consequently Bazin’s ideal of pure cinema, with its strict natural homogeneity and indexicality is both critiqued and reformed. When viewing a film, the spectator sees the imagery before them and makes assumptions, calculations and informed decisions based not only upon what is now seen, but also upon previous experience and the context of the world currently being perceived. With the introduction of such cinematic techniques as compositing and realistic-looking VFX (digital or analogue) alongside other live-action imagery, the visuals can be seen as establishing a cinematic variant of Pattison’s construction of atypical scopic regimes of seeing and perception. Their situation begins to re-orientate how cinematic reality is classified.

To explore and augment this idea, another scene from Raimi’s *Spider-Man 3* provides a useful illustration. The Sandman character, performed in the film by Thomas Haden Church, but also ostensibly through CGI animation, demonstrates a strong reconsideration of Bazin’s methodologies. I cite Sandman as ostensibly presented through CG animation, but importantly the character’s imagery is not solely built upon digital data and virtual images from computer programs and systems. The birth of the character is a scene that consists of 11 shots, with the first unbroken shot running for
almost two minutes and consisting of a complex piece of CGI animation\(^25\). Beginning with an extreme close-up of grains of sand, appearing as big as boulders, the shot steadily pulls out to reveal the sand moving and shifting forward with apparent life. Occasionally the sand appears to fly through the air, as if caught in a wind, but as the shot progresses the grains coalesce to form a bodily structure which sporadically falls apart before reforming with greater solidity (Figure 3.13). The shot ends with the Sandman more obviously akin to a human being and as the “camera” draws near his face the character raises its hands with a mixture of fascination and disbelief. The duration of the shot in itself marks it out as particularly interesting, since though it’s a manifestly virtual image, made up of digital data, the shot plays upon the perceived authenticity that might be attached to long takes as a guarantor of an event’s unfolding in physical space and continuous time. The camera travels in a deliberately slow manner, allowing the spectator to follow the dense level of imagery as it happens. Spectators are able to track the passage of the digital sand, from the slow shift of the seemingly huge grains and, as it pools forth across the dune-like surface, its build-up into the final figure.

Even in the initial moments of the shot we have several different elements that conspire for attention, with the grains having slightly different speeds of movement, colour and size that constitute values of performance. These movements offer avenues for close inspection, with the viewer tracking the motion of the CGI grains, as we would examine the movement of an actor or object through space, or the changing contours of their face registering emotion. An example would be that of Ricci as he walks with his son at the close of *Biciclette*, featuring a medium close-up of Lamberto Maggiorani’s facial features twisting subtly in anguish. The shot, though intercut with those of his son, uses the action of movement as Ricci moves through the street, a man lost amidst the crowd, and the contortions of his face to effect an empathetic connection. Broken down to its most basic elements we can see a similar rendition of movements within the Sandman shot as within *Biciclette* – of Ricci’s muscle, skin and bones functioning in motion. Though the movement is translated through CGI elements, the use of software

\(^{25}\) See the video of Sandman’s “birth” (“Spider-Man 3 - Sandman Birth”).
allows an analogous interpretation of movement within a shot that can produce emotive connections with spectators\textsuperscript{26}.

The shot’s differing eventualities and rewards are based upon the duration and spatial depth of the shot, recalling Bazin’s concrete unity and the natural effects produced from capturing the apparent subject matter. Though this digital manifestation of events is based upon a series of separate elements, many of them not in any real existence outside of a data stream, the visual perception is of a continuous and unbroken long shot of apparently physically “real” sand that create a similarly “real” character. The Sandman appears to have a physical being, one that is grounded in previously existent Bazinian concepts of being present in a real space and captured by a photographic record.

The unity and realism of the shot is however generated primarily by the digital effects artists and the subsequent compositing of their work. Only through their labour and the use of various software programs does the shot finally exist. But its basis is also dependent upon the amalgamation of a series of images that are layered on top of one another, steadily building up the shot. This illustrates a use of invisibility, because only by concealing and therefore making invisible certain previous and underlying elements in order to reveal the following one is the next necessary step to the final compositied shot achieved. To wit: the animators first created the character in his CGI form by developing an “underlying bipedal model” using character animation (Duncan “Enemy Within” 102). The character animation team also worked alongside effects animators who layered the basic model of the Sandman with particle simulation to replicate the sand grains. The particle simulation of the sand itself was based upon a comprehensive system of so-called “eggs”, basic egg-shaped spherical graphics, which represented the basic motion and movement of the sand prior to the finished image, which was placed within the shell shape of the character (Robertson “Triple VFX”). As digital effects supervisor Ken Hahn

\textsuperscript{26} Though dispassionate about the film and Sandman in general, SotoJuiceMan’s review of \textit{Spider-Man 3} at Comicbookmovie.com’s tellingly notes the emotive aspects of the CG character: “he is a cool villain but he shouldn't be the main villain. I saw his storyline and I realized what a waste of talent. He should be a VILLAIN not a OH IM NOT THE BAD GUY, IM TRYING TO HELP MY DAUGHTER type villain” ("SPIDER-MAN 3"), whilst cadairjr05 reply on the review’s forum concurs: “Raimi’s problem was he wanted the audience to empathize with EVERY villain (well, except Green Goblin)” ("Reply to").
noted, these eggs produced a basic geometric illustration that allowed the effects animators to see how the sand would work as a real element (Ibid. 103).

James Kakalios, interviewed by Liane Hansen, speaks of the evident use of real life physics relating to sand. He explains:

[S]and is a fascinating system. It stacks like [a] solid but can pour like a liquid, and by just changing the space in between the grains by as much as - as little as 10 percent, you can go from a light fluffy configuration, which makes it very difficult to hit and Spidey’s spider-strength is basically useless as he punches at just a pile of sand or he can change the packing of the grains of sand to be as hard as rock and slugs Spidey and knocks him out of an armoured car across a construction site. So all of that that [sic] he does in the movies and he also does this in the comic books, perfectly accurate from a scientific point of view. ("The Physics of Sandman")

Kakalios continues, explaining that lab experiments on sand’s properties made use of both computer programs as well as the “Brazil Nut Problem”, where larger grains of sand when shaken in a can of mixed sized grains will ultimately rise to the surface – just as with Brazil nuts (Ibid.). He concludes by stating that Sony VFX used both computers and the material experiments in designing the Sandman’s properties.

This combination of actual physical experimentation, as well as computer simulation centred on physics-based algorithms, allowed the animators to understand how the character would move, how during his nascent steps he loses part of his corporeal form as the substance falls away as real sand might. Furthermore, it allowed the artists to build the substantial physical practices of the character as he takes his first proper steps and the subsequent fights and evasion of Spider-Man. This basic “blocking” of the character was then made invisible: the particle simulation software was layered on top, once again blurring the edges of the physical and non-physical worlds (Desowitz “Spider-Man 3: Breaking Down Sandman”). The instances highlight how the virtual properties of filmmaking – prevalent from its birth in the use Méliès’s cinematicised black art, the optical composites in King Kong and Citizen Kane, and the development of
digitally synthetic VFX systems in the late 1990s onwards – intermesh with real life ontological forms, as well as critiquing and engaging with other analogic forms.

Once again, such instances are dependent upon an interrelation between physically existent and non-existent elements. For the birth of Sandman scene, in which the character swells up from the mass of sand, director Raimi shot videotape of Church enacting the scene on an office floor as a basis for the character’s genesis. This repeated “modelling”, as Raimi calls it on the DVD’s director and cast commentary, was used as reference material for the effects artists. It highlights how the value of performance within *mise-en-scène* is here recapitulated, made invisible by becoming concealed, and then begins anew within the digitally composited imagery of the Sandman’s being. The technique again uses rotoscoping. Produced by projecting frames of the live action onto a board, then tracing and using it as a framework onto which the final animation is then drafted, it was used to create the Princess in *Snow White and the Seven Dwarfs* (1937), as shown in the comparative stills (Figures 3.14 and 3.15). Rotoscoping therefore works as ultimately visually imperceptible, where the original rotoscoping is concealed by the animator’s drawings. The Sandman genesis scene inherently follows the same ideal, but does so at a removed stage, with the CGI animation using the aforementioned footage of Church as tertiary or tangential reference material. Yet arguably it still remains essential to the creation of the character with, as Duncan notes, Church’s performance always driving and informing the character (“Enemy Within” 103). Animation Supervisor Spencer Cook continues, “Any time we shot anything that was a sand effects shot […] we would put two high-definition witness cameras on Thomas […] so we could use all those angles to animate the character” (Ibid. 103 – 104). The high-definition witness cameras produced footage that tracked and logged Church’s motion exactly, allowing the physical
presence of the actor to be used, despite not actually being physically there in certain final shots.

A similar combination of live-action footage reference material was used to build up the particle simulation programs for the so-called “smart sand” that Sandman controls, the effects animators also drew upon days of live-action test footage that captured how actual sand moved against, over and interacted with different surfaces, objects and performers. During the filmmakers commentary on *Spider-Man 3* Scott Stokdyk notes that they buried stuntmen in sand in order to see how the grains flowed and interacted with their physiques, and how their thrashing at waves thrown towards them illustrated the realistic airborne action. This photographically recorded imagery, used as a basis to build the software that drove the smart sand once again reflects real-life physics and reality. Similar to Kakalios’s notes on the use of real sand (in the brazil nut problem) above, these tests and simulations based upon real and natural events ultimately return us to Bazin’s unity, wherein they are housed in a scene that exists to the viewer as a single inclusive shot of physical elements. It repeats and adapts the idea of an integral reality, reformulating its basis within a digital realm.

Bazin’s underlying temper regarding cinematic unity is that a film should respect the authenticity of the image. He states “All that matters is the spectator can say at one and the same time that the basic material of the film is authentic while the film is also truly cinema” (Bazin “Virtues and Limitations” 48). Though the Sandman character is ultimately more digital than physical – in both a sense of photographic capture and performance – his motion and representation are nonetheless an attempt at authentic real-world exploits. Its realisation is based upon both programs designed to represent how grains of sand work in reality and in unison with photography of Church, stuntmen and real sand. This once more recalls Prince’s ideas surrounding perceptual realism, where it is possible to see that the indexical nature of an object, such as sand, is represented as it notionally appears in the real world, but at the same time challenges indexicality. Prince notes that the water tentacle in James Cameron’s *The Abyss* (1899) has no profilmic referent, “bend[ing], twist[ing], stretch[ing] and contort[ing]” in a cartoon-like manner (29). But, he continues, “Nevertheless, digital imaging can anchor pictured objects […] in apparent photographic lighting (shadows, highlights, reflections) and surface texture
detail” (Prince Ibid.) As with the watery based tentacle, which sits midway between a typically elastic cartoon character and a realistic piece of liquid, so too does the sand that makes up the Sandman. Each aspect determines both the character’s particulate make-up and physical action during his first and subsequent appearances, and follows ideas of Bazinian unity in order to suggest the film’s fantastic characters occupy a believable space.

Placing together digital images that, particularly in the first shot of the Sandman’s origin, ideally follow sand’s physical make-up and its action into a scene that is to all intents a unified shot hides its deference to montage. Though viewers must surely know the shot is partly composed of elements that are not physically existent, the shots’ composition of separate elements is subtly done, since the joins between both the various digital elements and Church’s final metamorphosis back to human form are virtually undetectable. By creating an image in this way the filmmakers create shots that follow Bazin’s wish to create imagery that, whilst imaginary, also has “spatial density” (Ibid.), that enables and drives its existence. The concealing art of digital compositing therefore facilitates a montage of imagery into one shot, whilst removing the threat that previous mechanical and more noticeable montage and editing created. Unity is now realised within a film that requires a series of different elements to be edited together. Ultimately the reference material of both Church’s performance and of the actual sand, along with all other previous stages of character and effects animation is made invisible and removed from the spectator’s view by effects personnel.

Though the Sandman’s final form is a fantastical one, it is still based upon a series of physical elements and real world moments made invisible, now recombined and revealed afresh. Though partly referential and made invisible by the final event, the design and existence of the previous building blocks are of paramount importance in producing the shot’s final structure and making the character present for audiences. In order to correlate this existence we base our perception of the cinematic world seen upon Pattison’s noted selection of previously existing ideas and hypotheses, whilst also allowing ourselves to explore alternative scopic viewpoints.

As Pattison says of visual perception, there are numerous different scopic regimes – deviant or at least diverse – that exist and are accountable within our existence. Though
Pattison appreciates sight was and still is seen as “the noblest of senses” due to its position at the upper levels of the human body and close to the brain (32), it can nonetheless be critiqued (Ibid.). Pattison exposes that most “misunderstand the nature and significance of sight” and the ability and importance it provides in gaining knowledge, and in addition observes that sight is not a sense on its own, but that it requires integration with the brain (Ibid.). Visual perception is therefore not wholly based upon the acquired sight of objects as they stand before us. Pattison asserts blind people work just as well without sight and that “sight is in many ways affected by, dependent upon and integrated with other senses, such as hearing, touch and bodily position” (Ibid.). Cinema largely exists without the sense of touch, though Morton Heilig developed “Sensorama” in the 1950s and the “Experience Theater” in the 1960s, which used a series of smells, stereoscopic visuals and tactile elements such as heat, breeze, vibrations and tilting seats to create a virtual experience (“Inventor in the field of Virtual Reality”). But despite cinema’s essential intangibility, Pattison’s points surrounding the connection of other senses and more importantly its integration with the human brain are important to this discussion.

Pattison observes that sight can be easily fooled – cinema’s combined use of numerous still frames run continuously proves this (33 and 34). Moreover, the many illusory images and objects seen throughout history, from optical illusions through to sleight-of-hand and the creation of automata, highlights our willingness to be fooled. Pattison sees this willingness as established upon our constant association of sight with rationality, stating:

Platonic metaphysics was an ocularcentric, heliocentric philosophy of the emanation of creative light that formed the visible order. While light floods the eyes with sight, reason floods the mind engaged in theoria with knowledge of the physically invisible reality of ideas (33).

Or, as Pattison more simply says: “As rationality is to the divine, so physical sight is to reason” (Ibid.). The site of strict physical interaction as noted above is something cinema and general sight is essentially missing; we cannot physically connect with what we see
through actual sight. It is an aspect Rodowick also denotes, stating of film spectatorship: “Rather than a haptic object or a stable self-identical form, the film viewer is always in pursuit of an absent, indeed an *absenting*, object” (22). Yet as Pattison points out, the connection of the ocular nerve to the brain enables sight to be processed and through its connection a series of other responses are set off. As noted above, sight is affected, dependent upon and integrated with supplementary senses, including hearing and touch. More than this however, is the effect sight produces on the body’s nervous, respiratory and other associated systems. The effect can of course be reciprocal, with body affecting our vision. For example vertigo is a condition based in the brain and/or ear, which then affects sight, wherein people can begin to feel dizzy and nauseous. But aspects of sight can also bring on the effect of dizziness, nausea and an increase in pulse and heart rate, such as when seeing blood. Similarly, when we watch a film, the elements of *mise-en-scène* can cause a change in our body’s systems – such as excitement during an action scene that generates an increase in heart rate. As noted within this chapter, Bazin and other theorists concurrently sought to ascribe physicality within filmmaking as realism more greatly personified. To see the elements of *mise-en-scène* coherently within a scene arguably follows the Platonic rationale. However, we have seen that such rationale can be broken apart, fooled if you will, as sight itself is. Nonetheless, Rodowick also remarks that despite the technical innovations and evolution of narrative forms etc., “what has persisted is a certain mode of psychological investment – a modality of desire if you will” (22). There is, as Rodowick previously noted no “persistent identity” to film.

When visually perceiving cinema, the spectator is aware of seeing things from different positions – both literally and figuratively. Outside of his or her position within the auditorium, our bodies – including our brains and the cognitive impulses therein that drive us to finally decode and perceive - exist in different positions dependent upon what we take on board. Our bodies are affected by what we see and vice-versa. It is therefore arguable and indeed necessary to observe that such differences should exist within cinema, and embraced. Pattison states that rather than being attacked, such visual regimes, “can exist alongside one another” (30). Furthermore, philosophers sought to reintegrate sight with other senses, challenging the Cartesian style of vision –where sight and vision are viewed as separate from other senses. This “haptic vision” – named after
the Greek word that signifies “I fasten onto, I touch” - sought to “attempt a thicker more corporeal notion of sight” which would recover the haptic sensibility (Pattison 45). Rather than relying purely upon visual acuity, such thinkers as Bergson looked to assert the “equality of all the senses”, and the writer Georges Bataille looked to aesthetic schemes that “dethroned the eye” (Ibid.). Pattison points to de-objectifying and deifying pure sight and to convene the whole of the body into perception. He goes on “The eye is not a camera or a flashlight […] Rather it is involved in a complex set of interpretive, subjective, reciprocal relationships that constantly change” (Ibid.).

Moreover, Pattison asserts, “It is not the eye that sees, though sight would be impossible without it, it is the eye-brain working together in an integrated system that creates visual perceptions” (48). Consequently, when examining the origin of Sandman, we are decoding not just what we are visually perceiving, the rather fantastic CGI elements that are illusory, but at the same time orientating ourselves within the visual milieu or mind-set of the scene. Accordingly, our eyes and brain decode what we see and make sense of it – piecing together the non-physical digital elements in order to create a concrete unity. This action is one step beyond the usual act we perform when watching film. Rather than perceiving photographic elements in a “pure” elongated scene, such as those created by Renoir or Welles, or even scenes edited together out of similarly photographed elements, we are now perceptually relating with non-physical CGI and allowing it to affect us. Using a rationale that requires not just a more rigorous suspension of disbelief, but also reorientation of the systems of perceptual belief. Ironically, but importantly, though audiences are asked to connect with digital images that do not have the same physicality as photographic images, they are still processing them in a way that covets such physicality, indeed in much the same way as they actually have been doing for decades already. Pattison sees this as carried out in a haptic sense where, “In any visual encounter, perceiver and perceived affect each other profoundly. The embodied eye, is seen and touched by, as well seeing and touching, the visible world” (45). Though spectators do not actually physically touch the world through sight, Pattison ascribes visual perception as able to symbolically touch objects. Therefore viewers would make similar contact with cinematic images; those images that cannot be physically present are visually touched and contacted and in turn make contact with us.
The steps carried out to create such shots as the Sandman’s origin, as with so much composited CGI animation, produce imagery that continually exists in seeming alternate worlds and therefore require alternate perceptual bases. These are skewed visions of realism, but views nonetheless and can reasonably be seen as realistic within the context of a film’s world. As V. F. Perkins notes, “The continuity of the end product is, most often, an impression that has to be constructed and protected in spite of the radically discontinuous method of shooting” (Perkins “Moments”). Shots, such as those of the Sandman, or the opening of Revenge of the Sith, of Gollum in The Lord of the Rings films, and many more are fashioned out of disparate elements that are placed into the duration of their final shots. Moreover, their continuous existence in a realistic world of interpretation is based upon an aesthetic of discontinuity, due to the discrete creation of said elements, and yet through compositing, continuity prevails. But the concept of discontinuity also blooms in how spectators deal with realism.

Once again this returns us Stephen Prince’s perceptual realism, since it involves audiences organising a series of continuous elements in what might be referred to as a discontinuous realm. As Prince points out, new modes of interpretation must be enacted when dealing with the flood of CG imagery, since they establish credibility out of things that cannot be photographed. Therefore, as noted earlier, images must appear realistic even though they are also referentially fictional – or both real and unreal (Prince 32). In viewing the birth of the Sandman we can see this illustrated by the shot’s capacity to both appear realistic, developed upon real world bases, and as a fantastical event. As stated above, physics drives the way in which the sand falls in the animation program for the character’s smart sand, as does reference of Church playing the human counterpart. Additionally we have CGI sand that looks very much like real sand and physical and facial animation produced by effects and character animators that create a very strong approximation of the necessary realistic virtues of a living creature.

The apparent opposing viewpoint stems from those last words, that this is a living creature. The Sandman is not, of course, real. It is real and simultaneously unreal, inhabiting a space that requires us to piece together a concrete and physical unity out of many non-physical units. The creation of such moments, characters, landscapes and other imagery is accomplished by developing a combination of scopic regimes, including but
not limited to Bazin’s ideas of ontology, which operates alongside Prince’s perceptual realism. This in itself is linked to the ideas of haptic vision, wherein we move to interrogate what we see, then get in contact with and connect to the images. Rather than notionally looking at objects, images and the world at large the spectator must seek out these elements and then decode them, symbolically make contact with them and subsequently make sense of what they are seeing. As Pattison underlines, “Images […] can be regarded as dynamic, changing phenomena that manifest (or fail to manifest) themselves in many different ways. They are happenings or events, not just things or ideas. In this sense they are, and remain, alive” (74).

So, despite the Sandman being only partly alive – ostensibly when played by Church and the use of his performance to drive the character – the spectator brings the character alive, even in its most extensively digital manifestations. Prince notes that the creation of such CGI is aided and enhanced by perceptual cues that reflect properties operating within the real world, such as reflections, other lighting cues and more veiled aspects such as textures, and skeletal and muscle movement in creatures (33). Prince continues to note such cues are an extremely powerful means of gluing together synthetic and live-action environments, which use “Multiple levels of information capture” to complete shots (Ibid.). So, despite the falsity of seeing a Tyrannosaurus Rex within Jurassic Park, the perceptual cues generated from texture mapping of the creature’s skin, the underlying gait of their movement and its compositing with live action allow them to “acquire a very powerful perceptual realism” (Prince 34). When seeing Sandman throughout Spider-Man 3, equivalent ideas are expressed, where audiences move to make a reality from the ostensibly false imagery by gluing together the various cues. Hence a spectator’s knowledge of sand’s movement and its actual physical make-up is conjoined with other perceptual cues such as lighting and the mobility of a human being in order to produce a perceptually real image. Though referentially unreal, the CGI is realistic in perceptual terms because our brain, plus our eyes have haptically connected with the truthful elements.

Prince notes that the indexicality of an image is a necessity in creating such images and therefore the point of origin for perceptual imagery is something that exists in the real world (35). But he also highlights that cinema features an inherent dichotomy
which digital imagery readily exposes – that cinema both “indexically records” and “stylistically transfigures” – and as a result cinema theory must move beyond its insistence upon the inherent constructed and artificially discursive nature (35). For though all of cinema is an artificial construct, in terms of form or ideology, Prince contends the necessity to move beyond examining artifice alone, since the referentially unreal can simultaneously be perceptually real (Ibid.). When viewing Sandman’s origin, and his continued existence, there is both a series of physically existent properties and artificial structures. Sometimes, as in his origin, the physical aspects are made invisible through the concealment of Church’s captured performance and related reference footage, and in its substitution with further layers of digital artifice. At other points, Church’s physical performance remains within shots and scenes, but is augmented with further digital elements that make invisible portions of the frame by concealing the ontological fabric of background, foreground and character. In Figure 3.16, Church is both ontologically present as a performer within the frame, but is also fused to a digital appendage of his mineral form. Removing the real elements of Church’s body, but retaining his physical presence as a basis for the imagery, uses invisibility to conceal referential reality but also reveals a perceptual variation.

In using such systems as compositing and suffusing the scene with digital additions perceptual reality begins to emerge, allowing the unmistakably non-referential and unreal to take hold. Consequently such scenes as those within Spider-Man 3, Sith, Clones and others, introduce new scopic regimes that ask spectators to critically engage with, and, as Pattison proposes, make contact with their vision. By using both vision and the interpretive systems within the mind, audiences can begin to make contact with the
cinematic world. Though scenes within these films do contain physical elements, the use of digital elements begins to invisibilise the ontological and apparently realistic bases of cinema. It is therefore necessary to begin observing new rules of perception in order to piece together the digital imagery discussed in this chapter.

By developing, critiquing and imbuing Bazin’s ideas surrounding concreteness and purity with ideas enveloping digital media it is possible to see physical aspects of mise-en-scène have always been modified. Their subjection to montage through compositing and the development of disunity in analogue filmmaking has been furthered by digital effects, but concurrently the effects used themselves often revolve about physical constituents that have always been virtual within cinema. However, the constant use of invisibility highlights the constant breakdown of both physical elements and an introduction of incorporeal substitutes to build a scene’s totality. Invisibility is key, since it allows the building of such worlds and their intrinsic features. By consistently concealing and revealing new portions of reality the physicality of a film’s fabric and the reality therein is re-positioned, as are the surrounding theories. According to Bazin an image captures and thus mummifies the physical object photographed and, as noted in the introductory chapter, the physical substance of life is therefore preserved in this imagery (“Ontology” 6). But is it possible for the dormant image to be revivified, so that the ontological basis of a physical being dwelling within that image can return via digital techniques? It is this aspect that is examined in the next chapter.
Chapter Three: (Performance) Capturing Ghosts and the Undead— the Ironic In/tangibility of Invisibility

Introduction.

When looking at representations of the Invisible Man, such as those in James Whale’s film of that title, we see a tangibly human physical presence within them. When the tramp Mr. Marvel “meets” Griffin the invisible scientist in H. G. Wells’s novel he can only hear his voice and is consequently astonished and frightened. Even when discovering the truth of the situation he conjectures, that though real, the invisible man is still “Sort of Ghostly” (Wells 28). But though he cannot be seen, readers and viewers know that the Invisible Man retains a live, physical body, due to the development of exposition and details throughout the plot. Similarly, Whale’s film features several scenes where we see an apparently ghostly form, such as Griffin’s first appearance to Kemp when he spooks his fellow scientist in his home. Another scene sees Griffin commandeer a bicycle to escape the village, frightening his pursuers by travelling through the town with a cackle. Although we can’t see Griffin, we know he feels the cold in his meeting with Kemp as he asks for clothes, and we see the pedals of the bicycle move as it is ridden down the street, but it also gives the impression it is possessed. In contrast, Ghost (Jerry Zucker, 1990) shows the spectre of Sam Wheat (Patrick Swayze) being visually perceptible to viewers and fellow ghosts, but he remains invisible to girlfriend Molly and the medium Oda Mae and others who are still alive. More importantly, Sam is unable to touch anything for the majority of the film. After he is murdered, an astonished Sam reaches out towards his corpse, but his hand cannot connect with his dead body. Sam also passes through doors, has other characters walk through him, and only with considerable effort does he later manage to move objects via mental concentration. Though Sam has a presence in the film’s physical world (some characters are able to see and/or hear him), his physical properties are often null and void.

This chapter explores how the representation and visualisation of ghosts and other “dead” characters, which revolves around the dichotomy between physicality and
immateriality as achieved through visual effects, infers and plays with ontological presence via invisibilisation. As ever, though certain ghosts remain invisible, at least to certain characters within the diegesis, often the spectral apparition and other dead, or arguably undead, characters are partially or entirely seen. Moreover, though conjectured by parapsychologists as made of matter that is physically ambiguous, such as Charles Richet’s term “ectoplasm”, denoting an “exteriorised substance formed by mediums” that carried the materialised ghosts and spectre’s, in films ghosts are often portrayed by more precise physical forms (“Glossary”). These include actors, such as Patrick Swayze in Ghost, or Slimer, created via puppetry, in Ghostbusters (Figure 4.1).

Other examples do make use of much less visually perceptible aspects. There is an evocative use of sound effects by Desmond Briscoe in Robert Wise’s The Haunting (1963), where the innovative use of orchestral instruments produced shrill and eerie noises during moments when the heroine Nell feels a paranormal presence. In Here Comes Mr. Jordan (Alexander Hall, 1941), Robert Montgomery’s boxer Joe dies in an air crash, and on returning to earth is at first a ghost unseen by the general public. Having “lost” his body due to cremation Joe is given a new one - actually a series of bodies - that enable him to physically continue the life he has left (another fifty years). Though his persona continues and his guardian angel (as well as the film’s audience) sees Montgomery, the earth-based characters in the film only ever see the physical bodies of those he possesses. On a similar level to Jordan and Ghost, the ghosts of Topper (Norman Z McLeod 1937) are unseen by everyone but the audience, but like Mr. Jordan they are able to interact with objects and people. Additionally, Seymour Reit and Joe Oriolo’s Casper in The Friendly Ghost used a combination of cel animation and the voice
of Cecil H. Roy in the character’s 1945 cartoon debut. In each example audiences experience the phantasmal ghost constructed from a series of physical parts, sometimes they’re invisible to certain characters, sometimes to both them, and us as viewers. Cinema still uses certain physical objects so that audiences experience and engage with their presence on screen; be they actors, models, hand-painted animation cels, plus the orchestral music and recorded sound-effects produced by human beings.

But again at the centre of these various people and concrete elements - cels, instruments, models etc. – lies the field of invisibility. The technique of compositing, already noted as capable of combining the physical and non-physical through simultaneous concealing and revealing practices, and used to uncover new bearings in space and time, is also applicable in discussing the visualisation of cinematic deadness, partially due to ghosts often being popularly believed to be immaterial, transparent things.

Indeed apparitions, cinematic ghosts and other related dead characters - make use of invisibility in order to create a sense of cinematic presence. Though they are not always actually invisible, ghosts and analogous dead characters often make use of invisibility to create their presence onscreen. Through this they share concepts of invisibilisation that allow them to either appear as existing on the same visual plane as other human characters, or extant within an apparently real world that is wholly unreal (such as CG animated film). In so doing, the films discussed develop concepts that play with “ontological uncertainty”, a phrase used by Livia Monnet to denote how CG mocap characters develop a state of presence that is questionable in relation to Bazin’s conception of ontology (99). As noted in an earlier chapter, Bazin felt cinema was hinged upon the ability of the photographic image to capture the world objectively. Rather than the subjectivity of a painter, filmed images had a credibility and objectivity that the subjective strokes of a painter did not, producing a form of realism that secured ontological existence. Bazin stated: “[W]e are forced to accept as real the existence of the object reproduced, actually re-presented, set before us, that is to say, in time and space” (“Ontology” 13-14). This produces true realism “the need that is to give significant expression to the world both concretely and [in] its essence”, capturing “objectivity in time” that led to Bazin’s infamous idea of “change mummified” (Bazin “Ontology” 12,
14 and 15). For Bazin the photographic image showed existence most faithfully, but as already noted the physicality of the captured object and the surrounding reality is subservient to certain ersatz aspects of cinema. The virtuality of cinema, and its use of what we might term updated black art techniques have seen changes in both analogue and latterly digital visual elements. Through compositing and VFX, the ontology of cinema as it was proposed by Bazin can be broken apart, made absent, before becoming present again in newly configured ways. Those aspects imbued with a sense of ontological existence within films are then susceptible to change, and such explorations are extrapolated further here.

As a consequence I shall be exploring how Bazin’s ideas surrounding ontology have been critiqued, investigating notions of how the capture and presentation of objects are given a new sense of existence that changes certain qualities of their original make-up. Using authors such as Jeffrey Sconce and his work *Haunted Media: Electronic Presence from Telegraphy to Television* (2000), which posits ideas surrounding electronic technologies producing aspects of what he sees as "liveness", the chapter aims to show that the creation and integration of separate elements through VFX techniques and compositing bring new ontological life to film imagery. Sconce outlines the idea of presence, a label he sees as analogous to others such as instantaneity, now-ness and intimacy, as providing an “animating, at times occult, sense of “liveness” [and is] important in understanding electronic media’s technological, textual, and critical histories” (6). Such ideas will be expanded to further examine compositing and VFX. Alongside Sconce, this thesis will be using Laura Mulvey’s work on digital media and how it creates new elaborations on the position of existence within a film’s photographic and digital “frames”, which solidifies Monnet’s notion of ontological uncertainty. I will begin with an exploration of Zucker’s *Ghost*, and surrounding films that deal with aspects of the dead and the afterlife, and how the composited frames make visibly present a sense of new existence within their texts through certain “dead” characters and elements. In dealing with these films I hope to establish how electronic technology makes visible that which was previously absent and unseen and how so-called finalised film frames become alive once more.

This ultimately leads to discussions surrounding mocap, a technique that has seen
use in creating both actual ghosts and living characters, but which is continually viewed as producing uncanny sensations surrounding life and death. The development of mocap, based upon a system that records the motion of performers, essentially invisibilises their original physical form, removing their ontological state from sight. Subsequently the acquired data is used to rig digital characters, rather like puppets, presenting audiences with new characters (Rickitt 208 – 9). In unison with critical discourses surrounding mocap characters and synthespians the chapter aims to extend ideas surrounding revivification established in the first half, and how synthespians continue to evoke aspects of ghostliness, death and new aspects of existence and life.

**Composited Presence.**

In *Haunted Media* Jeffrey Sconce examines telegraphy, wireless, radio and television’s ability to synthesise liveness and produce a sense of presence, despite them being technologies that are inanimate and lifeless. Sconce describes how certain of these media proliferated alongside the rise in interest in the afterlife, and speculation about the existence of extra-terrestrial aliens. As a result there is, Sconce writes, a connection with death (ghosts) and realms beyond the known limits of our world (aliens), which such media bring to bear upon society. Rather than perceiving them as inanimate, Sconce notes that certain people saw electronic media as giving the impression and sense of being “animate and perhaps even sentient” (2). The author analyses how such technologies are credited by some with the capacity to “contact incredible and unseen yet equally ‘real’ worlds”, such as the afterlife (Sconce 10). Though he most often deals with aspects of electronic communications that are based about sound and basic signal, such as the telegraph and radio, Sconce’s approach is telling in the weight the electronic and indeed mechanical media places upon creating a sense of liveliness within cinematic media too. The models, puppets and use of special and VFX effects techniques to create ghosts and more besides arguably continues Sconce’s approach within cinema’s audio-visual compositions. In each instance the technology in play simultaneously allow the inanimate model and the optical printer to make the ghostly characters have, in some way, liveness.
In the last chapter of *Haunted Media*, Sconce examines how a sense of presence is produced within television broadcasts (167 – 209) and how film is an opposite medium, unable to produce similar liveness in its content. He states: “Television seems ‘live’ […] because its scanned images are always in the process of ‘becoming’ at the ultimately unrealisable terminals of transmission and reception, producing a ‘living’ quality that pervades the medium and its programming” (Sconce 173). Cinema, with its use of film that indelibly records onto silver-coated celluloid, is to Sconce a medium that is already past its point of being alive. Cinema for Sconce is, with its individual frames, now a deceased, and finished form, holding the vestiges of movement in a state of perpetual immobility, or arguably death. Potentially however, when in motion these individual frozen moments become reanimated and provide a new mobility to the forms suspended within the frames. In combination with additional electronic and digital techniques, cinema’s potential for producing liveness as developed by Sconce is arguably enlarged, becoming a near-perfect medium for the inclusion and representation of ghosts and the (un)dead. Though film might always be conceived as able to reanimate images of the dead – of actors, stars and the work of directors who have died – as noted above this chapter shall be more focused upon ghostly characters developed by visual effects, as well as other manifestations that feature a state of deathliness and reanimation. In essence, visual effects give cinema the potential to bring back the dead and to create a sense of deathliness, which arguably creates a new type of existence.

In certain respects this re-conceptualises parts of Bazin’s notion of mummification, as outlined in “The Ontology of the Photographic Image”, where the author sees the principles of preservation as continued in photography and cinema. Bazin relates:

The religion of ancient Egypt, aimed against death, saw survival as depending on the continued existence of the corporeal body. Thus, by providing a defense [sic] against the passage of time it satisfied a basic psychological need in man, for death is but the victory of time. To preserve, artificially, his bodily appearance is to snatch it from the flow of time, to stow it away neatly, so to speak, in the hold of life. (“Ontology” 4 - 5)
With cinema Bazin sees the automatic principles of mechanical reproduction at work, allowing an objective recording of objects by the “Instrumentality of a nonliving agent” (“Ontology” 7). The cold unliving mechanics of a camera enables the precise recording of people and locations, producing a record that accurately preserves and records the moments of time – or as Bazin puts it “change mummified” (“Ontology” 8). Bazin continues his analysis along the lines of cinema’s explicit ability to capture realism. He states: “It is no longer a question of survival after death, but of a larger concept, the creation of an ideal world in the likeness of the real, with its own temporal destiny [Where cinematic image-making allows] the creation of an ideal world in the likeness of the real” (“Ontology” 6). But in addition to transcribing the world and mummifying performers for all time, Bazin’s theorisation on cinema also lend themselves to reanimating the mummified, and through further electronic technology produces a sense of life and presence. Through the techniques of VFX, and latterly mocap, the captured objects, people, and moments are reiterated and given a new type of existence beyond Bazin’s original notions of ontological existence.

Bazin highlights the change in Western painting in the 15th century where it moved from an “age-old concern” with defining “Spiritual realities” to one that combined this with “as complete an imitation as possible of the outside world” (“Ontology” 6). Bazin conceptualised cinema as the creation of expressions of the world that were both concrete and captured its essence. And, where photographic technology’s ability to precisely record the details of objects surpassed the capabilities of hand craftsmanship, this new pictorial medium moved beyond merely “fooling the eye”, casting out the incursive human hand. Furthermore, Bazin noted that cinema produced a form of realism where the only element between the object and its reproduction was that “instrumentality of a nonliving agent”, technology (Ibid.). The use of the words “nonliving agent” acts as an interesting lead into how photographic and cinematic media act as mummifying instruments. As a further embodiment of representation beyond life, nonliving produces clear crystallisations of petrification and mummification, holding life in situ within pieces of celluloid. When watching films, audiences observe actual moments of time transfixed. Arguably, both theoretically and practically, a film provides better imitation of life than a painting, whose brushstrokes faintly invoke the details of a building, the lines of a smile
and the surrounding skin, or the glimmer of a sunset or sunrise. But, if given the correctly assigned, organised and processed film stock the spectator is provided with images that contain the finest details of everything laid before the shutter. Moreover for Bazin this captured essence is produced without the aid of human interaction. The mummification of life and the surrounding world is completed by technology; life is preserved, and a lifeless agent produces it. Bazin continues:

Only a photographic lens can give us the kind of image of the object that is capable of satisfying the deep need man has to substitute for it something more than a mere approximation, a kind of decal or transfer. The photographic image is the object itself, the object freed from the conditions of time and space that govern it. No matter how fuzzy, distorted, or discolored, no matter how lacking in documentary value the image may be, it shares, by virtue of the very process of its becoming, the being of the model of which it is the reproduction; it is the model. (“Ontology” 8)

As Bazin says above, the photographed object, “freed from the conditions of time and space that govern it”, feasibly marks cinema’s ability to theoretically parallel the processes of mummification seen in ancient Egypt and subsequent artworks that hold objects in equilibrium. In each, the form is freed from the usual constraints of time, or at least slows their effects down, and films use the same method, albeit more symbolically. Furthermore, Bazin’s use of the word “model” is another step towards how cinema works to engender the complete approximation of life, but also its preservation. Precision, perfection and exactness; these are some of the meanings surrounding the word “model”, and the mechanics of cinematic technology allow for exacting sustainment. Combined with the development to preserve and sustain, to mummify, the ability to model perfectly allows cinema and the films produced to create lasting iconographic testimony of life and the world.

The cinematic medium therefore offers film frames as a style of suspended animation and then, through the projection process, gives the frames energy anew and as part of this reanimation provides the basis to summon up and visualise ghosts. Cinema allows not just the precise holding of images within film frames, but to generate motion
and life anew. Though cinema arguably provides visual testament it is not just single images; through the motion of film running through the projector the frames burst with something akin to a re-energised form of cinematic existence. Often these frames provide us with actors and the surrounding world as life captured and recorded, but life and the world is always moving forward and the mummification process soon takes hold. Past stars, as mentioned previously, become reanimated and then there is the figure and character of the ghost in cinema.

Daniel Ogden notes ghosts of Greek and Roman times were described as the “restless” dead, belonging to one of several overlapping categories. (146) Ogden outlines the categories as the Aôroi (“those dead before their time”); Bi(ai)othanatoi (“those dead by violence”); Agamoi (“those dead before marriage”); and Ataphoi (“those deprived of burial”) (Ibid.). What’s constant in these accounts is ghosts’ capacity to communicate. More specifically they try to connect with the living and to impart some kind of message. Or more broadly, no matter their type or constitution, they strive for presence in the physical world. A cursory search on Amazon.com in movies and TV sees the word “Ghost” register over three thousand titles at the time of writing. The character of Slimer in *Ghostbusters* is more comedic than he is frightening, a remit many of that film’s other phantasms share. Mrs. Muir’s Captain Gregg and Sam Wheat in *Ghost* are both lovelorn spectres that respectively wish to connect and re-connect with their beloved. Furthermore the ghosts of Tobe Hooper’s *Poltergeist* (1982) are used to surprise

---

27 “Movies & TV > ‘ghosts’.” on Amazon.com provides a list of 3,616 titles as of 9th June 2011.
and shock, many of which are models and puppets (such as the one shown in Figure 4.2).

Such variable characterisations are often helped in no small part by special and visual effects practices, which once again invisibilise certain levels of physical forms to instil such presence and additional reanimation of the film frame. The characters and other peripheral effects that build such characters (such as energy, vapour trails, and pyrotechnic crackles of energy) are produced by compositing elements that are often ephemeral in nature, either being virtually or actually immaterial. For example the creation of the “neutrino wand” that is used by the characters to force ghosts into containment devices uses multiple levels of hand-drawn animation and miniaturising explosions (called “pinblocking”), optically composited on top of the original live-action. This conceals areas of the original film surface, but also reveals the new effects, which are also transparent or translucent in their final form. Similarly, effects which create the vapour trails of ghosts entering the New York City skyline relied on the compositing of animated elements and lighting effects which are physically inconsequential in comparison to the photographed buildings (see Fig 4.3)
These elements are designed to be seen, and provide a visual presence to the ghosts and associated aspects, but they are also somewhat visually immaterial – both on screen as spectral vapour and energy, and through the use of inks shot against black, backlit frames. This creates a hazy, unviable constitution, echoing the translucent nature of the ink but it is also noticeable and has a sense of definable presence. These optical composites therefore create variations to pieces of the film frame, producing new environmental spaces and action, and it is something not left to just ephemeral and atmospheric elements.

Primarily, shots featuring actors as ghosts might force audiences to see living characters, but when used in relation with other aspects of performance, and with the use of electronic media, this can be challenged, producing a form of electronic presence that echoes Sconce’s work. Sam Wheat’s ghostly presence is signalled in a number of shots orientated about profilmic actors performing as if Patrick Swayze/Sam isn’t present. For example, when Sam first takes Oda Mae to meet Molly to convey Sam’s warning of danger, Goldberg (Oda Mae), Moore (Molly) and Swayze (Sam) are all photographed conventionally without the aid of any special effects. The scene relies on Goldberg and Moore ignoring Swayze’s movement and also ignoring his voice. It is a technique that is simple but entirely sufficient and advantageous for the scene’s dramatic impact, and continues to be used in later scenes. But in addition to these scenes the film employs a series of “pass-through” effects.

The first such effect sees Sam’s ghost reaching out to touch his corpse as it lies in an alley. To produce the effect the filmmakers photographed two separate shots of
Swayze against a blue-screen, which was subsequently combined with a miniature model of the alley. By manipulating the two shots of Swayze via rotoscoping, the filmmakers could paint out certain portions of his hand, allowing Sam’s hand to pass through his head and body (Duncan “‘Ghost’ Stories” 6-7). The visual effects producers used such techniques instead of double exposure shots, since it enabled them to create more depth and definition to the ghosts, who visually appear almost identical to any other characters until such pass-throughs occur. At other points the visual effects technicians applied ink to individual shots on a frame-by-frame basis to create a “bleed” of Sam as he meshes with a doorway or wall, creating an effect as if his ghost was partially absorbing the object he passes through, instilling a sense of physical presence to the ghost.

A more sophisticated technological undertaking was used to implement other pass-throughs, with the film employing motion control systems to match the course of an arm as it passes through a wall or other object (Duncan “‘Ghost’ Stories” 9). For Ghost

![Diagram of matte shot composition](https://via.placeholder.com/150)

the motion control system normally allows a camera to repeat the exact movement through a computer program, enabling different passes to be made on an object to create different stages of the shot which are then composited together. Many shots of space ships, such as the opening of Lucas’s Star Wars when a Star Destroyer passes through space, use this process to obtain the male and female mattes necessary to insert the ship into a star-filled backdrop. A basic matte shot composition can be seen in Figure 4.4, and the motion control system allows the matte to travel precisely with the object that is to be inserted into the shot, a feat previously achieved by hand with sometimes awkward results. Without this exact replication of movement through motion-control the shot would be very difficult to produce satisfactorily.
the motion control technique was used, but with an added program that changes the
passage of the arm against that of the bleed (Ibid.). This allows the change in the ghost’s
constitution to be both precisely matched to the arm and other parts, but to also give the
motion a sense of presence and therefore liveness as the character moves at a certain rate
through the object and then to reverse this as he exits. In this respect it makes claim upon,
yet reappropriates Sconce’s analysis of liveness. It is not a live transmission like
television, but the cinematically captured visual effect is nonetheless given a new sense
of existence. This is because the previously captured photography – and Sam’s ghostly
body - becomes reanimated through incorporation of and melding with the electronic
motion control system and associated bleed program.

In each case the shot composites new elements into a frame that weren’t present
previously – such as the “bleed” - and invisibilises others – including portions of Sam’s
red shirt and the blue background of the set in which Swayze was filmed. In each
instance the use of compositing produces a sense of presence, and existence to those
aspects of the shot that – in Sconce’s terms - do not possess any life by bringing the
previously unseen into vision. The original processed film, featuring a background, or
Swayze’s basic performance, can be seen as finished, completed and therefore no longer
live. But Ghost’s pass-throughs, particularly those that use the motion control system,
realise the reanimation of the inanimate mummified portions of film already captured by
the camera by changing and reanimating its constituent parts. Swayze’s performance as
Sam is now transformed into a type of embalmed, preserved form and, as in Bazin’s
definition of mummification, is now past an active existence, but through the techniques
of rotoscoping and motion control it grants a new sense of presence to the actor (and
more importantly, the character) that were previously seen as finalised and expired. In
such cases the photographic images in the cinematic frame are now given a new existence
beyond its previous deceased ends, with the colour of Sam’s shirt now revived and his
form given a new sense of life.

As noted in chapter two, the use of compositing enables objects, both physical
and non-physical to be joined together on a new spatial plane. The cinematic likes of
Spider-Man and Sandman are built up out of both human performances and digital
imagery, as are a number of its locations. Similarly, the creation of Sky Captain’s 1930s
locations is founded on drawing together the live-action performances of Jude Law and Gwyneth Paltrow on an almost blank green screen set with CGI backdrops and associated craft and elements with each separated by numerous differing time zones and epochs. However, though also producing a sense of presence through electronic technology, the concealment and revelation in each of these films are located in real, if often fantastical, human characters. With Sam’s ghost the use of technology is used to give presence to a dead man. Sconce’s discussion of electronic transmission and ghostliness begins by examining Spiritualism, and how certain writers posited “spirits as inhabiting a series of celestial spheres emanating around the earth” (42). He notes that these writers “posited a simultaneous existence of the material and spiritual worlds within the human body, arguing that the soul itself was an electromagnetic phenomenon trapped by material flesh” (Ibid.). Spiritualism was based upon mediums, most often female, which contacted the spirit world in order to receive messages from departed relatives. Such a process allowed the public, “a means of discovering a place in this world by demonstrating a link with the next” (Lamont 21) and became established in the United States during the 1840s (see Carroll Spiritualism in Antebellum America). These messages were frequently received in the form of raps and noises, as in the case of two well-known proponents, the Fox sisters, though not always so. Indeed some mediums merely reiterated messages from the spirits in their own voices, answering questions and posing others.

Brett E. Carroll sees Spiritualism as a response to a number of social and cultural incidents surrounding the populace of America leading up to and during the mid 1800s that saw certain anxieties creeping into view. Carroll distils several aspects that created a necessary cradle into which the new religion became situated, including industrialisation, urbanisation and commercial capitalism’s growth (2 – 3). In addition, the growth in rationalism in the population and an increase in scientific materialism saw confidence in religions such as the Protestant faith decline leading, to anxiety and spiritual crisis. Carroll notes that “The fabric of American life seemed to be unraveling [sic], stretched and torn by forces which promoted selfishness, materialism, fragmentation and atomisation”, leading the way towards modernity (3). Carroll goes on to note the burgeoning Spiritualists, formed from various other movements (among them followers of Swedenborgianism, Quakerism, Universalism) sought out a reform of their beliefs
through cultural, social, moral, and scientific/quasi-scientific movements (Ibid.). As part of this, followers intermeshed a search for meaning with the persuasive doctrine engendered by Spiritualist religion, one that “constructed a cosmos at once personal and communal, liberating and ordered” (Carroll 5). Jeffrey Sconce notes Spiritualist doctrine running alongside electronic advances, including Morse code and the telegraph, as “hardly a coincidence” (24). The Fox sisters’ channelling of the raps – unseen in origin to the general public and hence seemingly paranormal – is caught up with “the similarly fantastic discourses of electromagnetic telegraphy”, a material medium based upon science and technology that nonetheless depends on areas of the electromagnetic spectrum that are invisible to the eye (24 – 25). The transmission and reception of the pulses that make up Morse code and telegraphy are similarly audible and through further (but nonetheless invisible) intermediates, are arguably supernatural and ghostlike, until deciphered.

Cinematic ghosts such as Sam continue the idea that the ghostly spirit is both a trapped electromagnetic phenomenon and perceived as distinct raps within the cinematic representation. The trapped interior of electronic pulses, unseen and invisible that predicates Spiritualist thinking, is able to break through into ways of representing ghosts such as Swayze’s Sam. This is because the technology that makes him appear to pass through doors and swaps his physical form for a ghostly non-corporeal one comes through the optical printer and the bleed program. This transforms the original “mummified” photographic images into newly organised elements that have a new sense of life, revivifying the previously finalised silver of the photographic image with new colours that suddenly pop into life from beyond the original confines of the frame. This reveals the new presence of a ghostlike or undead character, such as Sam and other similar characters via VFX, different to what was present before. However instead of aural raps that the “ghosts” used to strike out messages and create presence (in actuality mediums created the noises by mechanical or practical means) Sam and other ghosts are realised via a large number of visual strikes. These visual strikes – created by hand inking of individual frames, or via computer programs - rather than aural ones, appear on screen as sudden pops of new colour that absorb and make invisible the film emulsion as Sam’s form is transformed and enlivened. Most pertinent in creating this sense of life was the
development of the so-called “pseudopod-type fingers”, which used the variable rate of the “bleed” program to construct a seemingly living state to Sam as he begins to blend with the matter he’s passing through. As animation supervisor Charlie Clavadetscher recounted: “Each pulsing finger was a separate pass on a piece of oblong art that was moved and twisted by yet another program. These finger programs were added to the back-wave program [the basic element of the “bleed”] so their motion was connected. Then all of the passes of the fingers and back-wave were exposed onto one piece of film and sent to optical” (Duncan “‘Ghost’ Stories” 9). The mummified deadness of the image is now invisibilised, and is replaced by revealing a new enlivened presence of colour.

This notion takes Bazin’s “change mummified” and combines it with aspects of Sconce’s liveness of electronic media to create a new wave of representation, where ghostliness cohabits with living physical beings. Despite the character being essentially a vaporous form without full corporeal dimensions, depth and weight, as visual effects supervisor Bruce Nicholson relates: “[Jerry Zucker] wanted an organic and dimensional quality to the effects” (Cotta and Duignan 169).

In many respects the creation of the “bleed” invokes an update of spirit photography, a series of images first created during the late nineteenth and early twentieth centuries which showed the spirits of deceased loved ones returning to sit near the still living wives and husbands. As Neil Matheson tells us:

Spirit photography first emerged in the work of Boston engraver William Mumler, in 1861, when he began to produce photographs on which additional figures appeared who hadn’t been present when the portrait had been made, and hence became known as ‘extras’. (37)
Matheson goes on to note the extras seen in these images allowed photographs to no longer commit the, “living to memory, but rather the living-dead erupt within the space of life” (40). In actuality the apparitions (as seen in Figure 4.5) were in fact created through the addition of figures shot separately, and were superimpositions created by re-photographing the plate with the “ghosts” carefully positioned around the previously shot sitter. Debate and controversy continued around the validity of spirit photographs (Matheson 40 – 49), yet considerable numbers of the public retained a strong respect for the images, particularly during the aftermath of World War I since it offered the power of “re-establishing contact with husbands and sons suddenly torn from families” (Matheson 38).

It was respect meted to critics looking for the truth, such as Harry Price who continually looked for faithful examples of Spiritualism and associated media. Matheson gives details of Price’s examination of William Hope and the medium Mrs. Buxton. Bringing a series of blank photographic plates that were invisibly marked with X-rays to a session with Hope, Price subsequently wrote an exposé which highlighted a careful switching of his plates for another set that held spirits (46). However, arguments surrounding Hope’s work continued with numerous claims and counter claims that led to an apparent exoneration of Hope (Matheson 47). But subsequent to this, Price discovered a fellow who, involved with spirit photography, showed the psychic researcher a “ghost stamp”.

This small device held a bulb and tiny negative and could be easily concealed in the palm of the hand, and when lit up used to illuminate the negative against a photographic plate (Matheson 47). Such techniques allowed people, as Price noted, “to ‘recognise’ as their dead relatives the pictures of absolute strangers” in out-of-focus photographic images containing apparent “extras”29 (qtd. in Matheson 47).

Such matters return us to Ghost, a film that uses similar technology to create its ghost characters, with their spectral verisimilitude punching through into the preserved images to create Sam’s form. As with the spirit photographs, Sam and the subway ghost

29 These extras as they were called, were prophesised by the photographers to be the spirits of passed relatives, but were in fact merely anonymous men and women which the photographers placed in the images using devices such as the ghost stamp, and other secondary techniques (see Troy Taylor “Spirit Photography. Its Strange and Controversial History”).
played by Vincent Schiavelli are given their presence by means of a photographic image that, as Matheson states above, has the living-dead erupting within the space of life. Zucker’s film makes little pretension to the film being a reflection of actual ghosts, but the film pools together the notion that the spirits of the dead characters are indeed emitting into the space of the film amid the living characters. This is achieved through both Swayze and Schiavelli’s on-set performance, but it is also reliant on a more sophisticated use of the techniques seen in spirit photography. Namely, the visual effects create new elements that surround, sometimes obscure, but also reveal a new extant ghostly figure that punches into and has presence within these scenes. So when the ghost characters rush through physical parts of the settings, or have other characters rush through them the optical and electronic technology at work stamps out a new presence onto the film frames with a series of audiovisual strikes.

The implementation of these techniques begins to highlight aspects of ontological uncertainty, where the photographic stasis of the human character becomes redefined through further reanimation. Rather than just producing motion, which is an expected development in watching a film, the use of bleed programs and other VFX techniques that invisibilise and then ordain the basic background plates with new imagery, produces something that becomes different to that seen before. This in turn creates a level of uncertainty as to what is being viewed. Though viewed from a spectator’s perspective, one not necessarily informed from a VFX perspective, certain IMDB user comments make for an interesting commentary on where ghosts are positioned in terms of their ontology within the film. User cjd2112 writes, “If ghosts can’t touch/move objects, how can they sit in chairs and stand on floors? These are technically objects as well. Shouldn’t they float and never touch the ground/chairs/etc?” (“Serious”). Other users follow on from this, including: “At a microscopic level, if the ghost is coming “into contact” with the floor (i.e. being supported), they are still making a very small change to the material world”, before surmising the ghost would therefore produce a “cognizant, conscious change [or, if conversely] the ghost is just hovering barely above the surface, all to maintain appearance” (Ripley741 “Re: Serious”). What these anecdotal comments point towards is the fact that, for these spectators at least, the ghosts are expected to follow certain rules congruent with codes previously established, but which are different to those
necessarily expected of live human characters. Though ghosts are often perceived as floating apparitions, occasionally making contact with the diegetic world, the spectators above are unsure how to interact, and the VFX used in *Ghost* shows this. However the spectators signal they are willing to make a connection with the ghostly characters, partly because of their questions.

In *Death 24x a Second* Mulvey also explores new ways of examining ontological existence and presence in cinema. She notes digital technology results in “a new kind of ontology [emerging] in which ambivalence, impurity and uncertainty displace the traditional oppositions” (Mulvey “Death” 12). Rather than binary systems, such as reality/fantasy, and illusion/document, and life/death we might instead begin to see a series of modalities in play. As previously noted in chapter two, Mulvey sees the advent of DVD as transforming cinema’s distribution and reception, bringing new life to films (“Death” 21). Mulvey also views the dichotomy of cinema, where stillness and movement circle each other, as inherently touching upon issues surrounding life and death. In producing animation from stillness Mulvey sees cinema as inscribed with uncanny principles, where “the photographic index reaches out […] as an effect of confusion between living and dead” (“Death” 31). It’s a factor Mulvey sees existent in pre-cinematic technology, such as stage illusions, where the art of deception developed by magicians created a fascination with “the unnatural, the impossible and, ultimately, the supernatural” (“Death” 33). Illusionism and its practices saw a clash between rationality and irrationality, which saw audiences want to believe in the unbelievable as well as debunking it (Mulvey “Death” 34). Indeed, as has already been noted there is a constant battle between stillness and animation, which audiences must “defeat “in order to watch a film. This moment of uncertainty and certainty, located between the rational and irrational where films come to life, hints at aspects of both deception and the impossible becoming possible. One aspect Mulvey offers surrounds public interest in the afterlife. For example “spiritualists”, such as the Davenport brothers, were highly popular with audiences in the Nineteenth century who wished to believe in life after death. The Davenport brothers not only made headlines for apparently successfully contacting ghosts for their audiences, but also for subsequently being revealed as fraudsters by magician John Nevil Maskelyne. Maskelyne toured the same presentation as a revelation of
illusionism, done without spiritual connection (“Death” 44). Jim Steinmeyer notes in *Art and Artifice* (13) and *Hiding the Elephant* (94 – 97), the Davenport’s use of a “spirit cabinet” wherein the brothers – apparently bound - would mediate with spirits, who would use instruments in the cabinet to make contact. Steinmeyer writes:

They [the Davenport’s] were booed from the stage as fakes, hailed in the press as mediums, threatened, bloodied, cheered. At a time when the Victorians prided themselves on science and rationality, the two quiet young men from Buffalo, New York began a confusing debate about how honest a magician needed to be or could afford to be. (“Elephant” 48 – 49)

The audiences ultimately had a supernatural faith in the brothers, but Maskelyne soon saw through the practices and began to show the same type of show stripped of its spiritual conceits. This shows the period’s audiences as interested in both the unknown and a want to discover the rationalised answer in an entertaining form.

Mulvey sees the arrival of cinema as a continuation of this clash between rationality and irrationality, or what might also be termed deception and reality. She discusses the ability of the early pioneers of silent cinema to tap aspects of the marvellous and also the inexplicable, where even the Lumière brothers’ supposedly ‘realist’ work is “touched with mystery” (“Death” 36). The advent of Freud’s Theory of the Uncanny furthers her approach surrounding connections between the explicable and inexplicable. According to Mulvey, Freud saw death as triggering two aspects: “the dread that the already dead might return to haunt the present from the past” and “the difficulty of the living […] while accepting the inevitable, to imagine its own death” (“Death” 37). This leads to a space of uncertainty in between life and death “in which the boundaries blur between the rational and supernatural, the animate and inanimate” (Ibid.) In cinematic terms, ghost films - of which Méliès himself made many using the black art and stage illusion techniques – began to further an interest where audiences are both entertained and informed, particularly through behind the scenes articles and ephemera such as

---

30 See for example *Le Manoir du Diable/The Haunted Castle* (1896) and *Le Revenant/Mr. Jones’s Experience With a Ghost* (1903).
Cinefex and featurettes. Audiences are perhaps now more sophisticated, moving beyond the apparent fixations of Maxim Gorky, who as noted in chapter one saw cinema as sinister and troubling, and the apocryphal cries of audiences that witnessed the Lumière’s film of the speeding train. But the continued discussion of ghosts, and indeed puppets, optical, and more recently electronic techniques, which all surround essentially “dead” elements - shows a continued and healthy interest. This can be seen in the cultural popularity of Spiritualism and spirit photography, the enthusiastic responses of fans and connoisseurship within film surrounding VFX, film’s surrounding ghosts, horror films and arguably anything that uses spectacular VFX.31

Mulvey continues, commenting on the greater development of illusionists who debunked the charlatans. Despite the “rational” presentation of their acts, showmen like Maskelyne still produced momentary stutters in their performances, where audiences were “on the cusp of between credulity and incredulity”, thinking “‘I don’t believe it!’ while seeing it with their own eyes” (Mulvey “Death” 44). Moreover despite the ongoing build-up of rationality, the showmen’s ability to “purge” their magic tricks of supernatural penchants that gave them “super-humanity”, as Mulvey puts it, brings a further source of disbelief surrounding the limits of the human (“Death” 45). Of the stage illusionists, she says: “The showmen’s aim was to create a space for doubt and generate the frisson associated with the breakdown of understanding that gives rise not to a belief in the illusion but to a sense of intellectual uncertainty” (Mulvey “Death” 45). If we switch the stage illusionists for filmmakers and especially producers of VFX we can bring the intentions of these pre-cinematic illusionists through cinematic history to its (digital) present. Mulvey’s documentation of logic shuddering and trembling when we witness such moments can be extended to the VFX seen in Ghost. We are able to account for what is seen on screen, but simultaneously it causes analogous feelings of doubt concerning the deciphering of what the cinematic ghosts can do. For example, at times Swayze’s Sam acts to all intents and purposes as a normal human being – despite his invisibility to others. However there are other moments when Sam swipes at people to try and grab them, or at door handles, and indeed manages to use this immateriality to move freely through walls and doors. At such times the diegetic position of his existence is

31 As seen in Michelle Pierson’s book Special Effects: Still in Search of Wonder.
shifting through the VFX techniques and performance of the actor. All of which is encapsulated where Mulvey states: “[The] image of life was necessarily haunted by deception. In the cinema organic movement is transformed into its inorganic replica, a series of static, inanimate, images, which, once projected, then become animated to blur the distinctions between the oppositions” (“Death” 52). Mulvey sees these in turn arousing questions surrounding the nature of time, of existence, and of the return of the dead. Though Mulvey is here speaking of early film, the interaction of further VFX technologies, which invisibilise aspects of Swayze’s corporeal self in order to make present new visual elements and therefore change his character’s ontology arguably continues those ideas surrounding momentary gasps of shock at what we see Sam do – indeed with any VFX augmented/created character. As with the showmen’s ability to become super-human, the cinematic ghosts embody their temper through the interaction of technology and the human body: VFX makes the performance of an actor something more than it was, producing a new, different, ontological existence to engage with, offering uncertain moments to be perceived and dwelt on.

This can be seen when watching *Ghost* frequently, as Sam’s ghost interacts with other living characters and the world around him. Where before Sam was merely human, obeying the rules of gravity, and using his body as a normal human being, there are points after his death that change and extend his corporeal self. An early scene when Sam’s alive shows him knocking through walls, his athletic body on display, and swinging out of his and Molly’s apartment window to retrieve a large stone statue, before pulling it in. However, following his death Swayze’s bodily performance and Sam’s character, become enhanced through the use of optical effects and compositing. The already mentioned bleed program is used to change the profilmic record of Swayze and Sam’s diegetic character, allowing him to pass through objects and other characters. In respect of Swayze and Sam – particularly now, following Swayze’s death – Mulvey’s idea of questioning time and the augmentation of the body in something else (and more) is visualised and recorded. Ironically, Swayze/Sam’s life is again haunted by deception. Swayze/Sam becomes transformed through the optical tricks that more fully blur the distinctions between life and death. We know that there is a rational explanation to these moments, they are effects, and the film is an illusion projected onto the screen. But at the
same time the mix of profilmic characterisation brought by Swayze and the VFX that augments and changes him as a ghost creates a character that spectators now have to reorganise in terms of understanding. A new space is created for the rest of the film between ontological certainty and uncertainty.

**Layering in Electronic Deadness.**

A second and more compounded use of liveness and mummification in *Ghost* comes in the form of the “clickers”, ghosts that emanate out of and appear like shadows, which then collect the recently dead of evil souls and pull them into a hell of darkness. Called clickers due to the ominous noise they make, the ghosts were originally conceived as stop-motion puppets, but as their development continued the original premise became more performance-based (Duncan “‘Ghost’ Stories” 13 – 14). Using director/ animator Mike Jittlov, whose film work incorporated animating himself in films such as *The Wizard of Space and Time*, ILM set about using very slow frame rates to photograph the ghosts, which enabled them to create strange and eerie looking motion.

This development allowed a series of new visual impacts to be created, producing scenes that again draw on Bazin’s mummification theory. Bazin maintains: “The photographic image is the object itself, the object freed from the conditions of time and space that govern it. No matter how fuzzy, distorted, or discoloured, no matter how lacking, in documentary value the image may be, it shares, by virtue of the very process of its be-coming, the being of the model of which it is the reproduction; it is the model”

32 Dressed in a clicker costume made up of a basic black suit with a series of additional elements, such as a hooded cloak and a painted-on skeletal structure in white, Jittlov was able to hold position precisely for the moments whilst the shutter was open and then move when it closed. The scenes were shot in a blacked out set, producing an effect that drew on the black art illusion system, and Jittlov was used to produce all of the clickers in the scene where the villainous Carl is pulled into the shadows. Using the original live-action plate that contained Carl being pulled away from the lens on a rigging system, the effects artists rotoscope the basic positions for the ghosts and used this to block out the scene that Jittlov would re-enact (Duncan “‘Ghost’ Stories” 13). Each of Jittlov’s ghosts was shot separately and then printed as a black and white negative to create the shadowy character. These elements were subsequently bi-packed (that is, two film elements were sandwiched together) with each of the individual ghosts, which incrementally built up the numerous ghosts needed, and then finally added to the original plate.
(“Ontology” 8). Creating the clicker ghosts involved the placement of new objects on top of the basic live-action scene, removing the rigging from the background plate featuring Carl as he is pulled backwards and inserting the new elements into the scene through the bi-packing, creating both the literal and the figurative model that Bazin documents.

Jittlov’s clicker, conceived through a series of optical and electronic tricks, produces in its imposition of new elements a definite presence. It is both a representation of a ghost as a photographic object; a spectral object made up of negative photographic elements that are representative of an object. But furthermore, in the continuous unspooling of the individual frames that build up the clickers, their presence is given a quality that constantly revolves about death and mummification and something beyond. This is because in each frame we see the ghost’s images preserved in the actual film, crystallised in the silver and dye-couplers of the emulsion, before becoming reborn in the next frame and then suddenly dying again in a rapid ongoing revolution of a certain type of existence. In this sense the VFX shots are a model, but also one that is constantly death-based, a phantom model of presence shown both in and out of time, where it recalls Mulvey’s notion of stillness and animation as well as her expression surrounding cinema’s representation of life as illusive and blurring the distinctions between life and death (“Death” 31).

Struck onto the film, Jittlov’s ghosts have a presence that is quite distinct from that of Sam, since the use of stop-motion animation creates a far more sinister characterisation. Using the stop-motion system in combination with Jittlov and powerful fans allowed sudden bursts of motion to appear on screen, and through using a slow frame rate, fashioned an eerie and often strange liveness to flit into the frames. Noting the original stop-motion model tests, visual effects supervisor John Van Vliet discovered that the fans produced “otherworldly” effects when directed at the robes. Van Vliet continues:

We had big fans that were blowing the fabric all over, so for a couple of frames the robe might be in the same area and we would get this creamy flow off of it – and then it would suddenly be someplace else, it was frenetic and the effect it created was like some kind of energy all around the basic shape of the puppet. (Duncan “‘Ghost’ Stories” 10)
The effect was continued for the final live-action/stop-motion combination and, when viewed at normal speed, yielded discharges of sudden animation. This made the ghosts at times jitter and move with frenetic energy, at others an eerily dour calm. In this instance, as with others in *Ghost*, the spectral forms are arguably objects. As Bazin states, “freed from the conditions of time and space that govern [them]” (“Ontology” 8). But, like others on the film the clicker ghosts alternately appear and disappear into and from view, becoming ontologically indistinct. Their appearances are never quite substantial enough to be called truly physical - the reversal of the monochromatic scheme and use of optical printing creates a series of elements that aren’t quite solid objects. Furthermore, in combination with being produced in distinctly different spatial and temporal zones to that of the live-action plate the clickers became objects in flux, forcing a rearticulation of Bazin’s photographic mummification. Such ghosts flit into an existence out of nowhere for momentary expressions of being, using the process of invisibilisation to engender their cycle of appearance and disappearance.

A similar set of examples features in *Constantine* (Francis Lawrence, 2005), an adaptation of the comic book *John Constantine: Hellblazer*\(^{33}\). Though not explicitly featuring ghosts within the narrative, *Constantine* features scenes that conceptualise the use of invisibility, creating presence through VFX and espousing aspects of deadness in similar ways to *Ghost*. In the film, paranormal investigator John Constantine investigates a devout Catholic woman’s suicide. His investigation sees him perform exorcisms and even enter the domain of hell where he is attacked by numerous demonic forms, including “soul-eaters” called Seplavites. CGI is often employed over model work, producing presence by layering in incorporeal digital effects. One particular scene involving Seplavites during a late night attack highlights just such a demonstration. On an L.A. street Constantine and the sister of the dead woman quickly become isolated in a scene of ever encroaching darkness as the demons shut down street lamps and lighting in order to ambush the pair. CGI is invisibly used to augment the original location plate by removing automated traffic signals, along with practical dousing of the location’s

\(^{33}\) *Hellblazer* was originated by writer Alan Moore in *Swamp Thing*, and initially written by Jamie Delano and drawn by artist John Ridgway, 1988 – Present)
streetlights. But the arrival of the Seplavites shows how the incorporation of digital sound and visuals within physical settings creates a sense of presence for connecting with audiences.

Like the clicker ghosts, Seplavite demons also punch through into the fabric of the film’s frames. Their presence is initially and chiefly produced via sound. Barely seen and unsettling, the Seplavites’ ‘liveness’ is set up as a vast pantheon of elements through layers of swooping, thunderous sound effects of the creatures’ wings and screeches.

Discussing the impact of wireless transmissions, Sconce describes their effect as being unsettling. He states “[due to their] distant yet instantaneous communication through the open air […] [a]bstract electricity in the ‘ether’ made for messages and audiences that were at once vast and communal yet diffuse, isolated and atomised”, effecting a paradox where the lone listener felt: “kinship with an invisible, scattered audience […] yet they were also acutely aware of the incredible distances involved [and] their isolation” (62). Following Sconce’s ideas, sound effects are used here abstractly, like crackling electricity. No major physical definition is given to individuals, instead the presence of motion and physical weight of the demons as they move is communicated through an ether-like wash that floods the frame. Arguably they follow what Sconce calls the “etheric ocean” (63), a metaphor for the boundless and unknowable fathoms - vast seas over which communication through wireless technology took place. Through such media “Boundaries of time, space, nation and body no longer seemed to apply” (Ibid.). This is ably underscored in the capacity of unsettling communication with others through aspects such as “DX fishing” where listeners trawled the wireless spectrum for any sound and noise of interest (Sconce 65). This is cinematically complimented by the representation of undead and ghostly forms in films such as Constantine, Ghost and similar films. The unseen emanate from various origins and spaces into a plane of existence that audiences then perceive. In this scene it’s possible to see the sound converging in this way. But simultaneously due to its abstract nature, and the generation of disquiet set up through the darkness and fear from the characters, ontological uncertainty is also conjured.
The scene’s climax defaults to an amalgamation of both sound and vision to fully underscore this idea, as Constantine ignites a piece of holy cloth to blind and ultimately destroy the demons (see Figure 4.6). Designed as both a revelation of the horde, and breaking the build-up of tension, a shot of the cloth being lit is followed by a cut-in to a close up of a screaming Seplavite. As lead compositor Aruna Inversin says:

This destruction of the Seplavites was laborious, but all the pieces finally fell into place. 2D light ray effects were coupled with CG Seplavites and debris, along with a multitude of render passes, from scorch and bone layers, to skin and muscle structure. You can see several of the Seplavites as these slowly decay before they explode in the lower left of the frame. (“Constantine - Closed Q/A Session”)

All of the elements are extracted out of the all-concealing darkness by the compositor’s art, combined with the live-action footage to create a final shot that gives presence to creatures that were once human, but are now drained of full physicality. In this scene, as with others featuring Seplavites created through the imposition of CGI into scenes, the film produces a sense of liveness through electronic layers that issue out of an invisible realm. Though not directly spirit-like, such as Sam Wheat or certain ghosts in *Ghostbusters* (Figure 4.7), the Seplavites creation draws upon similar senses of non-corporeal presence that provide a sense of electrified animation, rather than the
mummifying and preserving practices of film.

Based on a full sized articulated puppet used as on-set reference for the actors and crew built by Stan Winston Studios, the Seplavites were finalised as a digital form, a series of characters that have no physical essence, but are instead built out of layers of immaterial electronic bits and software programs given a semblance of solidity. In this respect they capture the vacuous quality of what a ghost can be - a nonliving creature of immaterial qualities - which nonetheless has some semblance of presence and liveness, seeking to connect with the audience. Here the Seplavites issue forth from an “etheric ocean” of the digital realm, breaking into view from beyond the original confines of the film’s frames. But at first they do so in a more incorporeal way through sound. They follow Sconce’s notion of being scattered, diffuse, and therefore more dissolute because of both the physical intangibility of soundwaves. But equally there is a strange sense of community built between the sound effects that begin to give body to the creatures, the characters within the film, and the non-diegetic world beyond. Their creation in post production, distanced from the plate photography in time and space adds to this. Acting within a digital, wireless spectrum, this continues aspects of ghosts’ representations in cinema through VFX. In such films, boundaries of time, space, and body are made partially redundant through digital means. But despite the apparent physical immateriality, the sound and vision impacts spectators through a force felt just as physically and as assuredly as ontologically present elements.

Similar practices are employed to build the various other demons and undead that John Constantine encounters. These include those seen in a flashback to his childhood,
and a bus journey where an uncomprehending John sees an old woman’s features change
to those of a startling demon. The woman’s rather innocuous face transforms into a
visage that seems burned and mutilated, an effect that involved the amalgamation of the
actor’s face as filmed on-set, with digitally constructed textures and physiognomy of
decaying flesh\(^{34}\). Previously invisible, to both the audience and Constantine, the presence
of the true ghostly visage is laid bare. Interestingly, Bazin states that:

> The aesthetic qualities of photography are to be sought in its power to lay bare the
realities. It is not for me to separate off, in the complex fabric of the objective
world, here a reflexion [sic] on a damp sidewalk, there the gesture of a child. Only
the impassive lens, stripping its object of all those ways of seeing it, those piled-up
preconceptions, that spiritual dust and grime with which my eyes have covered it,
are able to present it in all its virginal purity to my attention and consequently to
my love. (“Ontology” 8)

Yet it is the introduction of digital elements that ironically lays bare the “truth” of this
scene, and that of the Seplavites noted above. Rather than the film just mummifying and
preserving the object as originally recorded, forever exposing their “truthfulness”, the use\(^{34}\) These include the removal of the actor’s nose, transformed into a vast open wound,
together with eviscerated lips and charred flesh (Figure 4.8).

These elements were added into the frame by Tippett Studios, who tracked the live-action
performance of the actor, matching the new textures against her features as she turns in
the frame to face Constantine, revealing the change midway through the shot (Fordham
“Highway” 45).
of electronically created layers alternately “strips” and then adorns the object to relay a new digital model to the observer. This is arguably “purer”, since the digital effects used are made up of layers constructed at their heart by the formally pure nature of 1s and 0s. As noted in chapter two, this electronic purity allows the images to become more conclusively enmeshed into the ideals of Bazin’s “total cinema”, where realism is sought through greater sophisticated technology. Though still mythic35, because it is cinema, not actual reality, the use of digital structures which appear more realistic means the images attain a sense of truthfulness, and presence that dislocates them from physical profilmic structures. The use of “sophisticated” electronic technology allows further disassociation from humanity, and therefore an enhanced sense of cinematic totality and realistic presence. Such revelations reveal a fuller sense of new type of presence brought forward by electronic means, produced out of an etheric ocean for the audience’s attention.

Because the use of digital effects and compositing produces new objects, characters, locations and forms that become unveiled from a digital “beyond”. Originally held within mainframes and software programs in one location, the sound and visual effects finally convene in the cinematic frame as new originations. Changed from their digital sources, the CGI, and still essentially invisible sound effects, conjoin and connect with the profilmic to produce dead and ghostly images anew.

So too can Sam’s presence in Ghost be observed through electronic technology, particularly his final appearance to Molly as he enters heaven. This scene, a softly defined yet brilliantly-lit scene featuring hazy figures made of light towards which Sam walks, involved a combination of the original film elements with a video element of Sam, fed into an electronic system called a “Harry”, that allowed electronic manipulation of the elements. As Richard Edlund explains: “Because of the look of the sequence […] relatively soft and strange – I began to think in terms of digital image enhancement” (qtd. in Duncan “‘Ghost’ Stories” 17). The optical equivalent, which could have been used, was scrapped due to time constraints, but in fact the inherent character of the process meant that the qualities of the film grain and the detail it contained could be processed

35 Recalling Bazin’s myth of total cinema, where the digital manifestation removes impediments of subjectivity that leads to a purer idealisation of capturing and storing the object.
digitally. The process, where the necessary elements were shot on film and then transferred to video and manipulated allowed for a softening of the elements, but retained detail that at the time (c.1990) digital video could not achieve. Duncan notes that video shot on the D-1 format was, though far higher in quality than broadcast video, still an inherently clean format (“‘Ghost’ Stories” 18), but the combination of film and video in fact created the necessary hazy and beatific nature of Sam’s ghost as it connects visually and (within the film’s frames) physically with Molly. Using a shot of Swayze filmed against bluescreen that enabled a clean insertion of the separately filmed Moore and Goldberg’s characters, the digitised Swayze footage once again uses invisibility to reveal the necessary ghostly qualities of the character. By introducing digitised elements, such as macro photography of tinsel via an endoscope to create a halo effect against Sam’s form, the previously mummified footage is transformed into an electronic presence.

Using digital elements, both *Ghost* and *Constantine* convene a sense of presence to characters that are not entirely with us. Though it is arguable that *Constantine* moves back into the realm of corporeal forms, the introduction of a digital ether that is made of incorporeal electronic signals layers in a series of new elements that begins to demonstrate presence that is incorporeal and invisible. By tracking the movements of performers, using maquettes as reference for the creation of digital characters and applying electronic additions into the frame, ghosts and the dead start to appear and yield presence. It is a feat that can be continued and developed even more dexterously through further digital techniques that seek to absolve the human body even further, leaving a ghostly presence that continues to impart an ironic liveness, where the living-dead as discussed by Matheson (in “The Ghost Stamp, The Detective and the Hospital Boots”), cinematically erupt within the space of life, producing further ontological uncertainty.

**DeathLife of Mocap.**

As outlined in the introduction, mocap works by taking the information generated by a performer via a series of sensors attached to their body, then transposing this data through computer systems and software onto a new body. Amongst its capabilities, this technology underscores a further stage in how ghosts are represented within cinema. The
style of filmmaking displaces the body and transfers its previous existent presence into a new arena. Using electronic technology human beings’ performances are moved beyond a corporeal and living reality, to a disembodied arena, and a type of afterlife. The technique features within animated films, including *Polar Express, Beowulf, A Christmas Carol, Monster House*, and Hironobu Sakaguchi and Motonori Sakakibara’s *Final Fantasy: The Spirits Within* (2001). Some of these films explicitly include ghostly and dead characters, but in addition it is possible to argue that other apparently human characters seen in these films are ghostlike and far more explicitly unsettling. The technique features prominently in live-action productions that include Jackson’s *The Lord of The Rings: The Two Towers* and *King Kong* and two of the *Pirates of the Caribbean* sequels (Gore Verbinski 2006 and 2007). In each, it is possible to consider how aspects of the performer’s body become freed from their corporeal existence and flow into a new form, to produce ontologically uncertain forms.

Authors such as Vivian Sobchack, Lisa Bode, Livia Monnet and Thomas Lamarre, have already explored the situation of mocap animation and argue the digital realms they inhabit as instilling uncanniness, a sense of unease and ghostliness in certain films. Bode, for example, notes that *Final Fantasy* follows early cinema’s effect upon Maxim Gorky, and the disquiet it conjured in him (174). Despite the abundant high technology featured in *Final Fantasy*’s making and its use creating futuristic worlds, Bode repurposes Gorky’s views. She notes that rather than seeing “condemned people drained of their vitality through mechanical process to become mere shadows”, the characters of *Final Fantasy* are “people shaped objects with plastic skins and blank gazes” (175). Bode’s reading therefore places the “human” CGI characters as redacted beings, no longer possessing human traits, arguing that they are beyond living. Similarly, Monnet positions a series of horror motifs in her text that characterise *Final Fantasy* as an enterprise haunted by undead souls, CGI manifestations that have the aforementioned “ontological uncertainty”, which “vampirise” the human actors who modelled them. What both authors continually observe is the sense of ghostliness, of a loss of life within *Final Fantasy* and other films’ mocap characters, where the use of the mocap system and

---

36 *Pirates of the Caribbean: Dead Man’s Chest* and *Pirates of the Caribbean: At World’s End*. 
digital expression of the characters removes reality and replaces it with a world of otherness and the uncanny.

Monnet writes about *Final Fantasy* as the remediation of certain concepts already present within early cinema and animation: the notion of “cinemation”. Taken from Thomas Lamarre’s idea, cinemation describes the interaction between live-action and animated cinema. Bode notes cinemation is “a type of film in which live-action footage and analogue animation, or their digital counterparts, coexist, simulate and remediate one another” (116). Its essence is located about the phenomenology of movement, as witnessed within the interaction of live action and animation (Bode 103). This is an extension, and manipulation, notes Bode, of the excessive vitality seen in early animation and cinema, such as the lightning hand or quick sketches of Windsor McCay within *Little Nemo* (1911). But in *Final Fantasy*, we see not the comedic sensibilities of a human interacting with an animated entity “emerging from his pencil or brush” (103), but rather a more forceful reinstatement of the concept where the excessive vitality becomes distinctly distressing. Rather than merely reinstating the “semblance of life” it reconstitutes the factors to explore “the construction of life (and death) in both analogue and digital cinema” (104).

Instead of seeing mocap within *Final Fantasy* as a continuance of the “élan vital” that renders visible “the life that is already there, the soul of the world”, Monnet sees *Final Fantasy* as problematising aspects of artificial life (or a-life), especially in the absence of women’s bodies (104). Unimportant for Monnet is the effectiveness of creating either living or dead/undead characters, but that female agency is missing (107). Outside of her theorisation surrounding this lack, Monnet concurs with Bode on several constituent factors that see the film as featuring characters that are incredible and immaterial – lacking real life. Central character Aki, Monnet notes is, “little more than a layer of texture and paint placed over a wire mesh structure covering the original motion-capture skeleton” (111). Monnet sees Aki as a sophisticated piece of rotoscoping and, like various rotoscoped characters that preceded her, this is a “ghostly, invaded body: a computer-animated trace of a real, referential movement” (Ibid.). Such characters are then walking ghosts, haunting the frame with chilling realisation.
Monnet’s perspective of digital construction is based on the simulation of cinema, software, and of idealised femininity. Crucially, however, her analysis renounces the multiple levels of creativity beyond the computer that are present in creating the characters. For Aki is not just the construct of digital mocap software, and male creativity, but also a series of other interwoven elements, including (but not exclusive to) a mixture of human beings that drive her creation and existence. Though partly driven by mocap data, Aki and indeed all the main human characters are also produced in part by more traditional “key frame” animation. Though defiantly ontologically uncertain, developing visual traits that make them appear uncanny and questionable as empathetic characters, the ontological basis is built with elements other than the purely artificial.

Key frame animation is a technique where the lead artist draws the vital parts of the animation – normally compromising the first and last moments of a sequence. Secondary artists and animators would then produce the in-between frames to complete the shot. In digital animation this process is still used with the lead artists creating the first and last frames, using a computer graphics station and tablet, with software completing the intervening motion. Rather than a series of “inbetweeners”\(^{37}\), the computer and its software create the in-between moments. Though Final Fantasy used mocap to gather the bodily information for characters such as Aki, animators still hand keyed the faces as well as their hands. As the “Making Of” documentary from the film’s DVD informs us, the lead animator assigned to a character would often study the videotapes of the vocal performer, such as Ming-Na (Aki) and Alec Baldwin (Gray) and then use this as a basis for their facial animation. But in addition to this the animators would also consult a library of visual phonemes built for each character that would allow them to select the requisite mouth shape for dialogue. Moreover the animators would fall back on using expressions of themselves taken from small mirrors that allowed them to obtain the necessary looks and facial movements for particular dramatic performances. Consequently, Final Fantasy’s human characters’ ghostly facades have as much to do with the input of human animators as much as the artificial extrusions produced through

\(^{37}\) An inbetweener is “An animation artist who does the drawings that fill in the action between the key drawings made by the major animator. The process is sometimes known as tweening.” (Konigsberg 188)
mocap. As a consequence, the creation of presence uses a profound level of further manipulation on top of the original electronic data acquired. Here the electronic presence created through mocap is added to and complicated by an inordinate amount of human work, hardware and techniques. *Final Fantasy* manages to invoke the previously outlined developments of revitalising mummification through the addition of further layers of effort, but does so in reverse. For example the characters motion and their presence are developed from frames created by animators who preserve the first and last positions, adding deposits and layers of mummified poses onto and into the electronic data in order to complete the characters.

Though necessary to complete the animation this intermingling of electronic and human labour creates a far more phantasm-like characterisation in Aki than perhaps many other ghosts within cinema and is perhaps the reason for its ontological uncertainty. This occurs because though you might watch a film such as *Ghost, Ghostbusters*, or *Poltergeist* with expectations of seeing spectres due to the films’ titles or narrative précis; *Final Fantasy* (despite its subtitle) appears as a science fiction experience. But the human characters within *Fantasy* produce far more uneasy sets of considerations. Instead of seeing characters that exhibit traditional motion and psychology, such as the more cartoon-like CGI animated characters seen in Brad Bird’s *The Incredibles* (2004), audiences are prone to see *Fantasy*’s protagonists as more eerie and incorporeal characters. Similarly, though Sam in *Ghost* has an intangible body and the typical haze of a ghost he still looks like Sam before his death and often acts like him too. Each character follows audience expectations, whereas mocap characters such as Aki and others do not, as viewer Lafe Fredbjornson says of the film, “It becomes creepy to see computer animation of human actors become so lifelike, yet clearly isn't” (“Final Fantasy”).

*Final Fantasy* consistently sees “leads” Aki and Gray and other secondary characters performing in awkward, stilted movements that are more undead in appearance than both the squash and stretch style (or “squash n’ stretch”) and conventional human movement. Comparing the style of motion in *The Incredibles*, the Parr family – a group of superheroes – have an elastic quality to their motion that allows them to move sinuously and with dynamism. Even when hiding in plain sight as a conventional middle
class worker, Bob Parr’s movement is lucid and his gait reflects a tradition of bodily motion seen since cinematic animation’s earliest days. The squash n’ stretch style arguably allows for a more realistic approach to animating characters’ bodies, at least in extant cel animation. As Paul Wells, Quinn and Mills note “Typical to Disney animation, characters’ bodies are configured as a series of circles that compress and extend as they move [demonstrating] how gravity, weight, speed, space and distance work to determine movement” (177), as highlighted in John Kricfalusi’s facial studies (Fig. 4.9). Though *The Incredibles* also offers, in Thomas Lamarre’s words, “‘hypercinematic’ movement”, this is in combination with what he also sees as “iconic characters (reminiscent of cel animation)”, which he feels leads to a “slightly cartoonish, iconic style of figuration” (131 - 132). Indeed Parr’s character – for the majority of the film a pudgy, overweight, man – is, though designed as a reflection of his advancing years and lethargic lifestyle, also redolent of the classic squash n’ stretch seen in the dwarf characters of Walt Disney’s *Snow White and the Seven Dwarfs* and the character design of Izzy Klein’s *Mighty Mouse* (1942 on). As a result, Parr embodies a sense of realistic classicism within the aesthetics of animation, even as he stands as a figurehead of digital technology. Though present day techniques of construction are evident, the CG imagery is technically and visually more polished, the accent remains on creating something still rooted in a typically old-fashioned, classic, animation.

Similarly, though breaking down the fourth wall and featuring imagery that is
hardly real in many respects, Émile Cohl’s *Fantasmagorie* (1908) arguably has characters that move in far more realistic looking ways than the infinitely more sophisticated animation of *Fantasy*. In part the images from *The Incredibles* and *Fantasmagorie* are an expression of the films generic disposition and stylistic qualities. But even the facial mannerisms of Parr and the motion of the characters in both allow for a more humanistic quality. In addition, the use of rotoscoping and studies of real people seen in films such as *Snow White and the Seven Dwarfs*, captures a far more satisfying state of human motion, despite their clearly animated representation we do not question their ontological status, because we gauge them contextually.

One quasi-romantic scene, as Aki and Gray discuss the various Spirits of the film demonstrates this well. The scene begins with rather ostentatious movements from each, particularly Aki, with her arms, head and general body in a series of jerks and stiff movement as she reacts to Gray’s questions whilst working at a computer station. The effect, garnered ostensibly through mocap performance, seems designed to both highlight the character’s activity, but it also seems planned to show Aki has some kind of life and liveliness. Bode argues this updating of the rotoscope technique fails to imbue the characters with a sense of liveliness, that the technology suffers from a lack of nuance and complexity (177). Though you expect the character to show some energy the motion is twitchy, almost anxious and perhaps the very visual definition of hyper-real. Indeed it can be argued that the characters are almost animal-like in movement. Aki’s head is like a bird twitching back and forth, whilst both often exhibit almost primate/animal-like motion. Gray’s hulking, heavy, and demonstrative motion, paint him as an alpha male, particularly when he shoves and subsequently holds (almost hangs) onto a control set in the ceiling. Aki similarly “displays” with a series of arm thrusts and heightened pointing which show her thin-limbed character akin to the motion of monkeys. Though each character’s movement can be seen as organic, living, they are – as noted above – more animalistic than human; primitive and base compared to the more developed physical behaviour seen in real life, 2D animation *and* the more classically animated CG of Pixar. Though equally advanced in terms of computer software, the use of in-between style animation, where in and out points are still set by human animators, allows more sophisticated and realistic – or at least more recognisably, traditionally and
“animationally” realistic - physiognomy within those images.

Certainly, the scenes featuring Aki and Gray appear odd and quite unsettling, yet there are perhaps other reasons as to why it plays that way. Creating the scene necessarily included the capturing of the performances, and these were subsequently interpolated by the mocap system in order to provide the basic skeletal framework. But the animation team would themselves have built up the layers of material in order to create the final character, placing necessary textures, details, lighting and other aesthetic elements. This required not merely a pre-set sequence to be put in motion, but the inclusion of decisions made by other people. Accordingly, it is possible to see that, despite the levels of technology required – both computers and software programs, the input of the living is required to bring these into existence. This endows the form with even more complex series of attributes beyond the digitally constructed form, illustrating an intricate marriage of the human and non-human labour involved, which might perhaps explain its ghostliness.

Tori Aldridge performed the character of Aki, but her performance data was married to Ming-Na, who provided the character’s voice. The lead animator for Aki’s character was Roy Sato and a series of subsequent character animators were also used to provide the in-between moments. These animators would have worked on facial animation as well as hands, and quite often partially or totally replaced the mocap data as it may have been unsuitable for the finished scene, necessitating some finessing and subtlety that the mocap could not achieve. In addition a group of artists designed the characters, and director Sakaguchi himself provided a number of drawings which would have aided and directed the other artists and creative personnel the design of Aki and others’ characters. Though such work was interpolated through computers, since using key-frame animation in CGI needs software to progress from point to point, it is clear to see that digital technology was not solely responsible for the character’s being. This addresses aspects of ghostliness and uncanniness outside of the mere technological standpoint, highlighting a confluence of digital a-life together with various human beings that create the unsettling feelings. In each case aspects of the animators, designers and artists’ minds, and their construction of the characters’ physical actions, are taken and
transposed through visual and aural means into a new realm. Though dependent upon technology to achieve this the fact is that they exist in an “other” realm that is not wholly digital, somewhere in-between. And this recalls Mulvey’s conception surrounding the uncanniness of cinema, (“Death” 31 and 36 - 37) where the animating impulse of films switches on a sense of deceptive haunting. As with early cinema, which saw the generation of motion as unsettling and creating a sense of uncertainty in connection to the life seen on screen, the mocap character can similarly produce associations of strangeness and a blurring of distinctions between what is real and not.

The consequences of this other non-digital realm, where live-action performance enters into an electronic realm, gelling with both extraneous layers of human labour and then set into a final celluloid base for presentation within cinemas, complicates how we perceive both seemingly human characters within mocap animation and their animated counterparts. Sconce sees television, and arguably by inference the digital world that now takes on-board the transmission of sound and vision (such as Satellite TV and the Internet) as seeming to possess liveness, where celluloid does not (172). The constant pulses of electricity that powered the cathode ray tube, updated within plasma and LCD displays that switch the necessary cells and pixels on and off, are also present within the complex chips of computers that transfer electronic signals. This system of data transfer allows the logging of mocap information through sensors and hardware and is seen as possessing liveness, despite being a piece of non-sentient technology. This is because it follows Sconce’s theorisations surrounding electronic media’s ability to attach a sense of animation to that which is essentially non-living. Though the data originates from a living performer, its movement and translation into digital content and construction, changes both the visualisation and dynamic of the movement. The mocap data is seen as a series of points relating to the performer’s joints (sometimes joined by basic graphic lines on a monitor), that show a restricted, shadowy sense of the body and its attendant motion. But, it nonetheless contains the movement – and through the monitors’ use of electronic pulses (either through cathode ray’s tubes or flatscreen cells and pixels) we see “life” issue forth as the data is run. We are no longer seeing the performer as they were, but a new, and to Jeffery Sconce’s mind, almost occult sense of liveness. The basic visualised data is no longer graphically approximated as human; it’s arguably somewhat alien,
strange, but still recognisable as (a)live.

But the introduction of further elements out of separate void, such as the creation of opening and closing animation frames and the final depositing upon film sees a closed set of preserved elements added into those seemingly “live” ones. Moreover, it is notable that despite the electronic liveness that mocap data possesses as it is in operation, it is ultimately switched off prior to interpolation, at least temporarily, and is finally mummified in film. It is therefore perhaps no wonder that *Fantasy*’s Aki, Gray and the characters played by Tom Hanks in *The Polar Express*, seem oddly out of place and eerily ghostlike. As noted previously, we make some sense of ghosts within previous cinematic outings that have been ostensibly presented as ghosts, using photographed actors and the creation of liveness and presence through puppets, models and animation. Such work is ultimately given a new type of existence through electronic transmissions, but ultimately becomes mummified within the film frames. It is therefore possible to see the finalised forms as dead, then reanimated once more. But the creation of a series of exceedingly complex characters, using both sophisticated electronic and human tools, embalmed together within a series of electronic machines, and connected with the start and end frames of key-frames are numerous steps further into the space of ghostliness than previously taken. Rather than creating mere presence, the liveness here is complicated by a sense of alternating “deathlife”, produced through an overt intermeshing of electronic and human presence that ultimately cancel each other out – hence, a more proficient and perhaps ultimate ghostliness occurs. Developed by Vivian Sobchack from Alan Cholodenko’s conception of animation’s inherent creation of what he sees as “life-death”, deathlife or a dis-illusion of life, rearticulates animated forms resumption of a sense of life, despite being extracted from non-living frames, models and similar static forms (Cholodenko 9 – 36; Sobchack 171). It is an aspect I shall be returning to in greater detail later in this chapter, but it bears close resemblance to the work of Mulvey noted above. As with early cinema’s capacity to engender a sense of wonder *and* fear due to its innovative modernization of technology as it presented something unseen before, the mocap animation arguably raises similar inclinations.

---

38 Though it must also be added, that with DVD and Blu-Ray formats, the resurrection of existence is constantly made, as Mulvey notes.
Though we see something that is animated, bearing a resemblance to both existent CG images, and something lifelike, there is a further boundary that is unable to be truly crossed. As with the frisson of excitement and unaccountability given to things of the supernatural and of a more intellectual nature with illusionism and early film. Feelings of “I don’t believe it”, despite the visual – if illusory – evidence, come to the fore with passion.

Monnet remarks that Final Fantasy’s manifestations fail to actualise and reconcile “several notions of life that are not necessarily compatible,” within cinema, including aspects surrounding animation’s illusion of life, but her criticism fails to account for the additional levels used to create the ghostliness in the film (108). As noted, it is not just the computer systems and software that build the ghosts, but also human animators and human vocal performers, as highlighted above. Animators have imprinted their own internal sensibilities and characteristics onto the shells of Aki and company, accordingly haunting Final Fantasy’s characters, which may certainly augment the ontological uncertainty. In a featurette on the film’s DVD, lead animator Matthew Hackett discusses how he used himself as a basis for the character’s facial mannerisms, playing out various eye movements as well gestures. The featurette’s narrator states: “According to Andy Jones, the animator director, the fact that he worked late nights while listening to [the music of heavy metal acts] Nine Inch Nails, Marilyn Manson and Korn, made Matthew Hackett the obvious and perfect choice to serve as lead animator for the film’s bad guy” (qtd. in “Hein. Character File”). Character designers purportedly visited Hackett, as he was essentially animating the character on his own and was putting in many of his own traits to make the character exist. The stills of Hackett (Figure 4.10) and the final character animation (Figure 4.11) show a very close similarity between the way in which the character works as an animated entity that pulls upon aspects of Hackett’s physical appearance, his personality and mannerisms which, when injected into the digital character creates a series of different qualities both physically present and absent.
Far from being just an abductee, as Monnet ultimately sees her, Aki is a then character of differing multiple elements. None are clearly seen in the finished film, being visually imperceptible as fully functioning entities; but multiple entities are present – at least two of which are female (voice performer Ming-Na and mocap performer Tori Aldridge). This is a factor that Monnet focuses upon, exploring Richard Doyle’s “*abductive ontology*” (107). As she notes: “In its guise as hypothesis, abduction gambles on the unpredictable, working through an intensive substitution – that of a single conception, which is swapped for a complicated tangle of predicates attached to one subject” (Monnet 108). The digital humans within *Final Fantasy* are thus predicated, and Monnet finds them disturbing due to the tensions, *différance*, and fractal relations between the various versions of life seen (108). But arguably it is not merely the use of the electronic and digital technology that predicates this tension and *différance*, but the human action that intersperses the electronic liveness. Rather than purely being haunted by Monnet’s titular a-life – that artificial life current within the digital realm – Aki, Gray and the other characters are also resplendent with the phantoms, spectres and ghosts of flesh and blood organisms. Compared to Brad Silberling’s *Casper* (1995), which also features a digitally animated ghost, *Fantasy* and *Polar Express*’s characters are far more chilling than the updated Harvey Films character, despite the fact that *Express* is, like *Casper*, a family film. Unlike *Fantasy*, *Casper*’s digital ghost was both a psychologically and technologically simple character, which especially relied upon a computer processing an animator’s instructions for the digital puppet’s rigging (see Vaz and Duignan 267 – 271). Though also reliant on Silberling directing the animators as he would a live actor, and vocal performances, Casper and his three Uncles rely more on the liveness created by a computer interpolating a set of instructions from the lead animator than the more complicated multiplicity of mocap, key-framing and the extant technical paraphernalia
used to construct them.

What mocap in effect provides is an invisibilised characterisation of a performer that makes absent considerable levels of the original performance. By stripping down the actor from his full corporeal self – removing the flesh of his face, the actual muscular undercarriage beneath and the intrinsic physicality of which the body is made up – and replacing it with a series of points, the empathetic humanity of the character is lost, or at least is subject to doubt. As Figure 4.12 shows, the performer becomes a stick figure on a monitor and though the motion is quite precisely tracked, it has to be subsequently built up with layers. And it this multiplicity of electronic techniques meshed to other human ones that, in creating presence and liveness, produces more improbability and strangeness than other cinematic ghosts. Ironically, more generic ghosts developed in animation and CGI – such as Casper - have more personality and empathetic registration than Hanks’ Hero Boy from Express (Figure 4.13). Despite being partially transparent and created through more traditional animation techniques, Casper is able to perform more forcibly, have more electronic presence and more élan vital, than most mocap characters. Like many other digitally created characters, Casper was built out of a number of software programs, with each creating certain elements. As Tom Williams of
ILM states:

For each part of the process we have a different tool, such as the basic animation, a tool for skin and muscle movement, painting tools necessary for providing wrinkles or skin folds or coloration on an animal, lighting that will match what was on the set [...] a tool to match the live-action camera exactly. (qtd. in Vaz and Duignan 259)

This use of digital tools creates a character such as Casper much like the analogue puppet of Slimer in *Ghostbusters*, where the ghost was also constructed from various layers. Constructed from a mixture of wire rods, foam rubber and a level of electronic mechanisms within his body and subsequently performed by a set of operators in combination with further post-production processing, the character finally conveys presence. Though digital, Casper is similarly built up, using a wire frame skeleton base, which is moved by animation software (controlled by animators) and completed by further programs that colour and texture its surface (Ibid.). Conversely, the surplus amount of elements used by – and the unrealised tensions created within – the mocap system and its attendant extra human aspects cause far more uncanny and supernatural spectres to become apparent.

Indeed, perhaps largely due to the nascent technology in play for such films, the reliance on additional labour in creating mocap characters ultimately means that characters like Gray, Aki and Hero Boy from *The Polar Express*, need the additional layers of animation to be layered onto the frame. But using these additions to craft the facial animation cannot, for example, address the “dead-eye” look of most characters. That these digital figures – or perhaps more correctly creatures – are unsettling is never in question to Bode and Monnet. But it is important to note that no synthespian, as they are often described (see Bode, North 149 - 150), is as yet an entirely digital construct – it is one that oscillates - requiring finalising by other compound factors. Moreover, cartoon-like digital ghosts, such as those seen in *Casper*, puppet-ghosts, or indeed ghosts such as Sam Wheat who appear human, are comprehensible. And though we might also be scared by ghost characters, such as the puppets and models in *Poltergeist*, or indeed the actors who play ghosts in M. Night Shyamalan’s *The Sixth Sense* (1999), these too are also
comprehensible due to context. But the synthespians discussed so far are frequently more unsettling because we do not expect them to be what they are – that is, a character created via a mixture of apparently lifeless machines that produce a sense of presence and the finalised additions of further supplemental others, including the recorded input of animators, sound recordings of vocal performers and others. These elements do not fully intermesh in these characters and that is why they unsettle critics such as Monnet.

Lisa Bode’s article *From Shadow Citizens to Teflon Stars*, rearticulates aspects of Monnet’s theories, but still views the mocap characters as troubling. Bode’s implicit theme is that the human characters within *Final Fantasy* are akin to manufactured materials, such as Teflon. For Bode, Aki and company appear not as people but “people shaped objects with plastic skins and blank gazes” and in their manifestations manage to “call forth a disquieting uncertainty” (Bode 175). Bode reshapes Monnet’s ideas of Aki et al as invested with a sense of vampirisation, to beings that are possessed or haunted, since for Bode vampirisation makes them altogether undead (Bode 177). Instead the characters are therefore ghostly, but once more their inefficiency to be convincing animated characters is due to the lack technical subtleties within the finalised forms. In creating the mocap characters of *Fantasy*, the Teflon effect that appears to make up the bodies of Aki and Gray emanate from digital mainframes. Instead of the photographic lens stripping away the grime of the object to reveal Bazin’s purity, the electronic construction allows for a step too far in removing the corporeality. Invisibilising the mocap performers’ actions arguably creates the most ghostlike characters whether they are wanted or not, because the electronic equipment used cannot provide enough corporeality and presence. Further human labour is necessary to rebuild these forms, and from this issues forth characters now overly inarticulate and too misshapen. In effect, these mocap characters, in relying too much upon digitality to create their presence, are unable to wholly support the personality, producing an uncanniness in the character that is subsequently left further debased by attempts to rescue it from this state.

For Bode, *Final Fantasy* moves into Masahiro Mori’s notion of the “uncanny valley”, that area where a robotic form shifts on a curve from something that is comfortable and assuring in appearance, and therefore something with which we can
empathise, to something troubling and creepy (Bode 176). Bode’s situation of CGI mocap characters within her text is that they are digital dummies, or puppets that follow on from Jentsch and Freud’s reading of automata. These “bodies” potentially provide both “unwelcome reminders of our bodies and their future inevitable loss of animation” plus a “deadened or inanimate” representation of the living (182). But she also notes that the importation of digital technology allows a rearticulation of the figures on view (Bode 183).

A parallel argument might be made that the mocap characters are perhaps the best representations of ghosts and the (un)dead, not just robotic automata. Though merely a supposition – arguably nobody knows what ghosts truly look like, if they exist or life might continue in some new form – it is an idea with some weight within the context of cinematic ghosts. In films ghosts sometimes act weightless and flimsy in connection to the ground and solid objects and, with the immateriality of their digital construction, mocap characters can also be seen as possessing spectre/dead-like appearance and functioning. With their dead-eyed countenances, and waxy, textureless skin, Aki, Hero Boy and company appear more zombie-like. Their awkward, inhuman motion and exaggerated, melodramatic mannerisms produce unresolved digital characters that do not work as the human characters they purport to be in the diegetic reality of their films. They appear similar to the shuffling zombies of George Romero’s Night of the Living Dead (1968), and others of the sub-genre. As their characterisation issues through from the mocap data, built up and revealed from a previously unseen digital domain, they work not as living, nor as dead, but somewhere in-between. They have some existence - moving, conversing, their features registering some attempt at thought and reaction to others and their surroundings. Yet, importantly, they do not have the same physical existence of the undead “hordes” as Bode noted, they are akin to ghostly vessels, but

---

The idea of the uncanny valley is produced when the robot form moves from something recognisably robotic to something no longer robotically recognisable, but also not human. It verges upon the human, but its lifelessness, its uncanniness, is present in aspects such as unconscious eyes, and waxy, synthetic skin. It is neither human, nor robot, but “other” and our inability to reconcile quite what “it” is causes us to feel strange and disturbed.

See La Horde/The Horde (Yannick Dahan and Benjamin Rocher 2009) amongst many others that pit humans against a vast swathe of zombies.
rather than being as physically concrete as either a zombie, or the hard Teflon-like casing of a robot, the ghostliness also presents itself directly through the inherent basis of mocap. That is: they do not have full physicality, being stripped down to streams of data; an invisibilised human performer now lacking skin and bone and the thought processes contained by the performer too. Only a vestige of physical matter remains in the computer, together with pinpoints of articulation and the thinnest connecting rods viewable on a computer screen. Though rebuilt with new matter, this is a set of hollow elements and layers that doesn’t fully exist, hence they are ghosts that walk.

Bode and North both point to the necessity of contextually placing synthespians if they are to work more fully. Bode sees the digital characters within *Shrek* and John Lasseter’s *Toy Story* (1995) as synthespians, and notes that they are more keenly life-like due to the way their motion has “bouncy fluidity” and their aesthetics are more “rounded, comedic and cartoonish in appearance” (175). Such stylisation allows them to be literally and figuratively more three-dimensional characters which “uplift rather than convey grounded physical realism” (Bode Ibid.). But though the characters are appreciably more realistic, due to our ability to empathise with them through their more cartoonish traits – on a similar level to empathising and connecting to characters within *Aladdin* (Ron Clements/James Musker 1992), or Ben Sharpsteen et al’s *Pinocchio* (1940) - we have to note the difference in their creation. Though Bode notes the characters reflect their surrounding cartoonish aesthetics and the “physics of their respective fantastic universes” (Ibid.), in positioning them as such she arguably misdiagnoses Shrek and others as synthespians. Rather than the paradigm of a synthespian which fills out the majority of her text, Shrek, Woody the cowboy and Buzz Lightyear were not fashioned using mocap and are more akin to cartoons and hand-drawn animated characters due to the use of squash and stretch and other visual aesthetics. The bouncy fluidity, chubby limbs and round eyes observed by Bode is in place due to artistic choices made surrounding the characters (toys, overweight ogres), their generic disposition, merchandising, and that of the narrative they are situated within. Both films are comedic dramas, which skew their protagonists into such stories, and ostensibly require them to observe the rules of such films. As such, the toys are stylised, fantastic, playthings - able to observe only imaginary (if diegetic) rules, and act accordingly. The toys then work as “existing”, but they are not
living breathing toys as humans are living and breathing, but more like analogous vessels. Similarly Shrek and his comrades enact adventures that are more akin to a Warner Bros cartoon short than the darker and more serious animated films such as Ralph Bakshí’s *Wizards* (1977) and *The Lord of the Rings* (1978), which used rotoscoping in order to achieve much of their content. That the characters of *Shrek* and *Toy Story* possess a semblance of life is due in part to the way in which they were conceived and animated. These might be viewed as ghosts of a sort, but they are not fully fixed within the realm of the “other”, as are the characters of *Final Fantasy*. They do not arguably follow the same conceptual and creative path as *Final Fantasy* or *Polar Express*’s characters. Therefore I believe the terminology “synthespian” might be more strictly controlled and imposed on a more specific area that deals with “human figure presentation” as denoted by the Kleiser-Walczak Construction Company (qtd. in North 149).

More adroitly, North argues that *Shrek, Toy Story* et al are films that feature computer-animated characters. North sees synthespians as perhaps working best within specific genres and films. He cites the titular characters from *Spider-Man* (2002) and Ang Lee’s *Hulk* (2003) as more succinctly activating a synthespian’s inherent principles. He cites Dietrich’s research into machine consciousness, suggesting the positioning of a “mental block” that prohibits the spectator fully engaging with a machine having consciousness (North 161). Similarly, such a theory disallows full engagement with the virtual human because it gives “a performance, a simulation of emotional responses based upon the input correlations between bodily and facial expressions and accompanying emotions” (Ibid.). This allows the placement of a realistic digital character within a live-action film; the synthespian can be output in such a way that we bypass these mental blocks. The placement of digital doubles in order to provide the necessary “super-body” – as North puts it – produces “a spectacular foregrounding of virtual acting” (167). Similarly, the Hulk is a fabrication of elastic possibilities, a CGI character that grows in size dependent upon the scene he is featured within and is partly based upon a motion-captured performance by the director Ang Lee.

But though North sees these as no longer “pure” synthespians – they do not exist in totally CGI worlds, but a mixture of digital spaces and live action – his text somewhat
obfuscates, by necessity, this synthespian purity. There is no denying Final Fantasy and The Polar Express both use digital characters, driven by mocap performances, within digital realms, and can be construed as purer (though unsuccessful) synthespian phenomena. But as I’ve already highlighted, the creation of any of these entities - both the uncanny “pure” forms and the more kinetic and spectacular iterations in Hulk etc. - are not purely driven by digital techniques. They are also realised through the attendant programs, animators and other personnel. The uncanniness and problematising elements that most authors highlight are executed by an amalgamation of numerous people. As North notes “the [current] state in which synthespians are made manifest is one of fearful, but fascinating mythology, rather than an inevitable path towards a future of artificial endeavours” (153). But if one considers the synthespian from a ghostly perspective the sinister ideal fits both purposefully and, more importantly, pushes the digital characters away from a focus of mere artificiality.

As with all the writers mentioned here, North focuses upon the technological sophistication of motion capture and digital techniques. Their arguments and theories skew towards how these new realms disallow much that is created as being seen as normal, regular and appreciably human. But few, including North (150 - 151), mention the coalition of human and technological energies in the creation of synthespians. This lack of denotation impacts their understanding of external human forces beyond the mocap performers. Though Monnet and Bode spend time discussing mocap, their consistent viewpoint sees the humanity of the performance being lost through the computer systems that interpolate that information. Moreover, writers such as Lamarre, Bode and Monnet consistently point towards deadness as a problematising quality within these films. Lamarre notes that the fascinating lingering idea generated by Final Fantasy is its attempt to “give the sense of an indexical real by replicating or simulating a brand of cinematic realism” (135). Akin to Bazin’s mummification, Lamarre argues that digital worlds of the film are founded upon the explicit sense that cinema as an analogue entity is dead and therefore asks: “How can the replication or simulation of something dead result in life?” (Ibid.). It is an idea that, as noted within this chapter, carries weight. But Lamarre seemingly refuses the importation of a literal “other” life into these films mentioned here also and how such tension creates not death, but post-death - ghostliness.
These “other” elements: the mocap performers, the key-frame animators, and all the others associated with the production of synthespians, transport their artistic and creative methodologies, to deliver their mentalities, their inner selves are figuratively transported from their bodies into these characters. As a consequence, as argued, these literal “others” thus become figurative others, creating tensions and strangeness that the characters cannot rectify.

The strangeness these characters offer, are a divergence from other arguably more incredible characters. Take for example the character of Gollum within *The Lord of the Rings: The Two Towers*, or the titular character from Peter Jackson’s remake of *King Kong*. In each, an inordinate level of digital technology was utilised to produce both characters in order that they appear diegetically real. Indeed the appearance, movement and level of detail in various aspects of their physical and moreover their conscious character was noted by critics. As Ben Walters says in his timeout.com review:

> Where the picture triumphs is in Kong himself. As with Gollum in the ‘Lord of the Rings’ films, the CG character is far more complex, rounded and engaging than any of the humans, developing from a villainous grotesque into a tragic, semi-heroic figure. Visually Kong is plausibly gorilla-like, with his screwed-up face, scarred torso and low, broad rump rendered in astonishing detail at rest and in action. But Jackson is able to outstrip his predecessors by a quantum leap in making Kong equally credible in behavioural and emotional terms, without anthropomorphising him too much. (“King Kong Review”)

Much of this praise is based upon a non-corporeal digital execution, using computers and software. The character of Kong might also be seen as ghostly – and not in a critically adverse scenario as the undead of *Final Fantasy* are. Since Kong is also built out of the performance of Andy Serkis, whose performance is first reduced and made invisible through mocap. Serkis’ performance is made absent, becoming metaphorically less tangible than his co-stars, Adrien Brody and Naomi Watts who continue to exist as distinct physical forms, recorded as they stand against sets and green screens.
Conversely, Serkis’s on-set performance is only a figurative one, his presence originally used to help gauge eye-line matches and some empathy for Watts. As Ron Magid reported in American Cinematographer:

Serkis’s experience on set echoed that sense of isolation: while wearing a gorilla muscle suit (created by Howard Berger of KNB EFX Group), he was positioned high above his fellow actors. “To create Kong’s presence, I spent a lot of time up ladders or on top of scissor lifts and platforms in the gorilla suit,” recalls Serkis. “Naomi [Watts] always had my eyes, so every scene was a response between one of us towards the other in the moment. Sometimes we could be up close beside the camera, and Naomi could touch my face if she needed to. (“A Large Digital Star”)

But these elements were made invisible in order that his mocap performance could be inserted into the final frame, alongside key-frame animation and other layers. Yet despite this invisibilisation, the tensions caused by the imagery of Express and Fantasy are not present within the characters of Gollum and Kong. Again, this is likely down to the characters’ contextual arrangement. Their super-bodies, as North sees them – and they are arguably super due to the sinuous technological creation – measure up more prodigiously than Hero Boy and Aki. As mentioned in a previous paragraph, their appropriate setting and fantastic proportions offset their composition and execution. Despite designer/sculptor Ben Wootten noting of Gollum that “clinically, he’s probably dead” (qtd. in Serkis 17) his presence is arguably more normalised, and less ghostly within the films he features in due to the surrounding characteristics, style and narratives.

It is not that Gollum looks precisely “correct” or real, but that he functions cinematically close to his description in Tolkien’s The Hobbit, and his character contextually fits what is expected. Tolkien writes: “He was a Gollum – as dark as darkness, except for two big round pale eyes in his thin face” (77). Vivian Sobchack’s paper makes for a compelling evocation of the debate. Like previous authors she moves to orientate the placement of synthespians as necessarily problematic due to the character’s inability to evoke true humanity. Sobchack notes:
While we never really question either Pinocchio’s ‘wooden-ness’ or his later ‘fleshiness’, in relation to CGI heroine, Dr. Aki Ross, and the ‘real boys’ of Final Fantasy, we hear again and again – and down to the most minute details – litanies of disappointment at their rendering. (174)

Indeed the difficulty she notes is a problem of scale of values and expectations, an incompatibility with what we see and what we expect (Sobchack Ibid.). For Sobchack, much like North, the characters seen in Final Fantasy and Polar Express are irregular and troubling when seen out of context, creating the aforementioned sensibility of deathlife. Sobchack rearticulates Alan Cholodenko’s construction of “lifedeath”, the cinematic animation of any entity, bodily or otherwise, that features both animation and nonanimation. Therefore in an “uncanny” sense it is, “the always returned ghost, the zombie, the dead in us – lifedeath” (Cholodenko 29), this once again is problematising, because it evokes the notion of a film filled with (in Sobchack’s words), “ghosts, the dead, and zombies” (171.).

Oscillating between absolute and fractional visibility and everything in between, these mocap ghosts work to establish a means of creating a presence, and liveness that “works” because the digital infrastructure that seemingly offers the presence is ultimately an encapsulation of deathlife. We see a sense of liveness and presence within most mocap characters, but the tensions present in seeing the eerie human-like forms like Aki, with her stilted motion and undead eyes makes for a rebalancing of the system, and death eclipses life. Only when the context is upheld – such as the placement of ghostly entities within ghost-based narratives, or the use of mocap within more fantastic and spectacular principles, characters and narratives – that the undead and ghosts are either able to shed their deathlife and become more lifedeath entities or not be troubling at all, becoming more terrific and stunning. As Sobchack notes (with North similarly surmising), it is within films such as Toy Story, with their more cartoon-like digital characters, that life seems to become housed; or else in bouts of fantastic entities, such as Gollum and King Kong.
Sobchack ultimately sets the problems of *Final Fantasy’s* synthespian characters as running towards an unobtainable goal, an advancement set upon the ideals of Bazin’s “The Myth of Total Cinema”. Quoting Perelman and Olbrech-Tyteca, Sobchack notes their “argument of unlimited development” that insists “on the possibility of always going further in a certain direction without being able to foresee a limit to this direction” (qtd. in Sobchack 177). Sobchack notes the accompanying argument is of “the industrial (if not aesthetic) promise of CGI to attain, in an IMDB viewer’s words, a: ‘realistic, living, breathing and acting human being’” (Ibid.). However, Sobchack notes that Perelman and Olbrech-Tyteca’s observations can be repurposed about diminution and to examine “certain terms which fall short of the ultimate term, but are really the center [sic] of the debate” (178, author’s original emphasis). That is to say whilst spectators look for ultimatums (of, in this case aspects of realism) they also seek out – and find – levels which are lower than the ultimate realisation and focus upon them too (Sobchack 177 – 178). Consequently viewers read the synthespian as not completely perfect, and aspects of hyper-realism – that is simultaneously “not real enough” and “too real” – are both judged (Sobchack 178). In trying to produce the faultless CGI character, audiences instead see the synthespians of *Final Fantasy* and arguably many of the other human-appearing examples mentioned herein, in negative ways that the characters can never escape from

This oscillating appearance of deficits and excesses, of simultaneously being “not real enough” and “too real” might be adjudged further, to explain the impact of certain mocap characters as ghosts. Sobchack’s referral of Perelman and Olbrech-Tyteca’s stance is yet another explanation of tensions presented by the digital characters. The uneasy ghostliness produced by the tensions, those other elements that get fused together with the digital data of mocap, explains not just the attempt of viewers to see the lack of living human spirit, but also to see an encapsulation of deadness. That viewers can see the opposite of life: death. But where Sobchack more openly explores the idea of zombies,

---

41 Note David Fullam’s statement on Google groups’ discussion page: “I can safely say I find the characters in Final Fantasy to be downright creepy looking, lacking both heart and soul” (“IMHO”).
the lack of physicality ultimately inscribed to the digital mocap creations arguably makes them more like ghosts. The characters are neither not real enough, nor too real, but ultimately sit within a sort of halfway-house, similar to religious purgatory where ghostly souls roam. As Carol Zaleski says:

[Purgatory is] the condition, process, or place of purification or temporary punishment in which, according to medieval Christian and Roman Catholic belief, the souls of those who die in a state of grace are made ready for heaven. Purgatory (Latin: *purgatorium*; from *purgare*, “to purge”) has come to refer as well to a wide range of historical and modern conceptions of post-mortem suffering short of everlasting damnation. (“Purgatory”)

The situation of Sam Wheat in *Ghost*, Captain Gregg in *The Ghost and Mrs. Muir* and the many ghosts featured in *Ghostbusters* amongst other spectres, as well as zombies and other undead creatures, highlight a similar cinematic presentation of such an idea, as well as presenting films as the equivalent of purgatory for characters, narratives and ultimately film stars and actors to dwell within. In each, the fabric of film acts as a dwelling place that holds, crystallises and mummifies their bodies, and surrounding ephemera. Further to this, however, is the ability of visual effects and the compositing together of these effects to revivify and make these objects and characters anew, through electronic and digital means, allowing a space that is cinematically speaking, purgatorial. Arguably other mocap creations, such as Gollum, and indeed even the characters of *Monster House*, might well be considered part of the same territory. But it is their contextual fantasticness and stylised rendering that precludes them from fully residing there. Instead they haunt a new location, a digital purgatory if you will, that is distinct from – if somewhat connected to - the existent cinematic version.

I have noted that such impacting of oppositions demonstrates that the deathly-styled mocap characters upon which my writing centres encapsulate the fact that these cinematic ghosts are characters and creatures that are both real and yet not real. Like actual ghosts and the undead – the definitive proof of which so far eludes us - the synthespian can be read as simultaneously existing and yet only ever alive onscreen as an immaterial presence. It is based upon a reduced and ultimately invisibilised human
performance, a transparency that we don’t fully witness; that nonetheless exists due to the impact of the numerous elements used to recreate it as discussed here. These characters, ghostly or otherwise, variously fuse pieces that exist beyond their original form – coalescing original human performance and other human and digital labour into new beings that have body, presence, but are nonetheless still physically immaterial. But it is only when the context proves to be too difficult to adjust to that the sense of ghostliness is truly fashioned. That is not to say that representations of previous ghosts, created by human performers or effects, do not create presence. Indeed, the use of machines to create a sense of liveness, witnessed from ghost-stamped spirit photographs, through live action, optical effects and animation, demonstrates the oscillation between life and death has often achieved noticeably good results.

As a continuation of Bazin’s idea of cinema using the “Instrumentality of a nonliving agent” (“Ontology” 7) to usher in the existence of something non-living, the mocap system seems ideally placed not to just create the physically fantastic things of our imagination, the monsters, aliens and creatures, but also the ghosts of our own selves. As cinema becomes more digitised, but literally unable to fully capitalise upon Perelman and Olbrech-Tyteca’s unlimited development, it is more fitting that the technology captures ghosts. If preserving the appearance of a human is “to snatch it from the flow of time, to stow it away neatly, so to speak, in the hold of life” (Bazin “Ontology’ 4), what better technique than digital cinema. By invisibilising human performance and making their presence material through technology’s electronic pulse - an oscillating AC current that gives and takes away that existence - cinema can house the strange ghostliness of the currently too technologically complex mocap characters. Though it provides a sense of liveness to these electronic elements, building an existence into the previous mummified remains found in and on celluloid, the new layers that move from invisibility to visibility produce a presence that is held within moments that, still stowed (as Bazin states) in a location of half-life. But it is not really as a half-life, but more as an approximation of life through ghostliness and death, of re-animating and unlocking something that has departed the original physical form and now exists as a new article. And this partially invisibilised digital body in an electronic locale of boundless limits, takes us to our final chapter.
Chapter Four: The Arrival of The (Digital) Invisible Man

Introduction.

Previous chapters have discussed how the concept of invisibility has shaped special effects in order to create a breaking down of various physical attributes within film form and style. Chapter one investigated one of the earliest “Invisible Men” – Georges Méliès – and how this director used the black art to make objects and elements invisible. Using compositing and the black art, Méliès displaced physical objects and dislocated space within his films, enabling him to break down the physicality of profilmic space via invisibilising techniques. Chapter two saw a discussion of how digital compositing and CGI has been used to instil a new ambit in creating *mise en scène*. By breaking apart the physical aspects of the film’s *mise en scène* in order to create these films’ realities, a new formulation of realism is achieved where invisibility is used to hide and reveal settings that alternately exist and do not exist. Chapter three explored aspects of ontological uncertainty, examining how ghostliness and death intermesh with VFX and motion capture techniques that invisibilised aspects of the frame to instil a new sense of life to what is essentially undead. What should be quite clear by now is a sense of physicality and the body, of the film and characters within, is redeveloped - where profilmic and nonprofilmic elements alike can be transformed through concepts of invisibility. This final chapter examines how concepts of invisibility as housed in modern adaptations of the Invisible Man use digital visual effects and compositing that reflect the position of the body as it is used in such films. It explores these factors through the works of writers who discuss aspects of digital media, the Internet, and VFX, such as Lev Manovich, and Rodowick in order to discus how digitality has changed and influenced aspects of the cinematic body. In addition critical discourses focussing upon cyberspace and cyberpunk literature from the likes of Dani Cavallaro, Stacy Gillis, Larry McCaffery, W. Ross Ashby, Scott Bukatman, Jon Ippolito, and Donna Haraway will highlight how the body in this era has become augmented - dissolving into an electronic flow that allows greater, though virtual, motion. These areas are built about organising streams of information that are routed throughout networks, allowing information to be often freely accessed. In
addition the Internet also sees a freedom for the user, who can roam its interior, and even when hitting (digital) walls, can find ways to move around them through hacking, freeing up that information – an area written into certain types of books and films.

The Internet is the reality of “cyberspace” and “cyberpunk” an offshoot of the science-fiction literary genre in the early 1980s. Its rise followed that of the cultural boom surrounding Silicon valley, an area in Northern California which was dubbed with the moniker by Ralph Vaerst and Don Hoefler, due to the large number of silicon chip manufacturers and subsequent hi-tech firms based there from the late 1950s onwards. By the late 1970s and early 80s, along with the sudden take-up of home computers by the world’s population, which galvanised interest in the technology and its place in popular culture, a series of books and short stories began to appear that were predicated upon the possibilities of the new electronic technology and its impact upon the world. Authors such as Bruce Sterling, William Gibson, John Shirley, Rudy Rucker, and Lewis Shiner, formed the basis for a set of narratives that featured technology literally harnessed to men and women in futuristic societies.

Writing on “The Cyberpunk Project” website, Erich Schneider sees the literature as “[extending] into its human 'components' [...] via brain implants, prosthetic limbs, cloned or genetically engineered organs [...] Humans themselves become part of ‘the Machine’” (qtd. in “Cyberpunk as”). Schneider’s definition marks the sub-genre as explicitly governed by technological iconicity and thematics that heavily impact upon individuals and society as a whole. It is a feature that the (anonymous) main author of the page on which Schneider’s definition appears substantiates, noting that cyberpunk is part of “[so] called Hard Science Fiction because of its heavy reliance on technology or biology to tell a story” (Ibid.). For literary cyberpunk then, the body is central, becoming interlocked with machines and/or displaced and located within a digital world. Characters roam free of their physical bodies, using technology to achieve new aims. In this respect

---

42 The term was first written by Hoefler in a series of articles in *Electronic News*, “Silicon Valley in the USA”, though Timothy J. Sturgeon notes the formation of firms in the area began much earlier from the 1910s onwards in “How Silicon Valley Came to Be”.

43 See page 4 of Jeremy Reimer’s “Total share: 30 years of personal computer market share figures”, which outlines the rise of the home computer and notes: “By 1984 the [IBM] PC and its innumerable clones were selling 2 million units a year”. 

they reflect – albeit spectacularly – similar systems at work in the real world. Here Internet users make use of the Web to enter worlds for fun and play, and make use of the technology at hand to communicate and work across great distances.

Outside of the Internet, further real-world continuances of the connections between man and machine have evolved. The public now have MP3 players inserted into their ears to provide music on a near-constant basis, while smart-phones offer virtually immediate downloadable information. In addition there is the prospect of 24-hour access to various goods. Moreover there is the boon of digital infrastructure and technology in numerous sectors of health, social and other related services, where artificial limbs, hearts and retinal implants enhance and aid the body. Though certainly a long way from actually dematerialising aspects of their consciousness into the Internet, the general populace, and businesses, government organisations and others, are connected to and heavily rely upon the digital media and technology at their disposal. As in cyberpunk narratives and the real world where users dislocate and invisibilise their physical selves for use within a synthetic, digital realm, roaming free committing actions without being physically seen, so too does the titular character of Paul Verhoeven’s *Hollow Man* (2000). The use of visual effects and the technical creativity of the artists that produce this modern Invisible Man showcase and reflect how such matters are achieved and operate.

*Hollow Man* features ambitious and egotistical scientist Sebastian Caine (Bacon) and his colleagues working on a top-secret military-funded research into creating an invisibility serum. Caine, working alongside ex-girlfriend and fellow scientist Linda (Elisabeth Shue) and Matt (Josh Brolin) has managed to turn a series of test animals invisible. But bringing them out of their invisible state, or “phase shift” has proved difficult. Test subjects, including one of a pair of gorillas, react badly to the serum intended to revert them leading to their bodies liquefying to death. Having finally discovered the correct formulation to the reversion process, Caine decides to test himself without telling his military supervisors. The experiment is a success, but they can’t bring Caine back and he soon becomes as restless and agitated by the serum as previous test animals had, a condition that is exacerbated by the discovery that Linda and Matt are now

---

44 See “Two blind British men have electronic retinas fitted” (Walsh).
sleeping together. As he becomes more unhinged, Caine moves from voyeurism and misbehaviour to rape and assault. Upon discovering his colleagues have revealed Caine’s state to the military, Caine begins murdering his colleagues in order to cover his tracks and escape the facility before the military take him away and close the experiment down.

Though Hollow Man is a film with characters using the sciences of physics, chemistry and biology to render their subjects invisible, the VFX techniques in Verhoeven’s film and its central character fiercely play upon aspects of the digital, and cyberspace. Stacy Gillis (partly quoting from Neuromancer itself) describes the realm of cyberspace in archetypal cyberpunk novel Neuromancer as:

the ‘consensual hallucination’ that […] ‘space’ behind the computer screen [where] connections are made within the matrix of computer networks. It exists in the world which is created when people log their nervous systems directly into the network, increasing the intimacy of mind and matrix. (“Cybercriticism” 205)

In many respects it follows on from Verhoeven’s previous film, Total Recall (1990), which also played with aspects of the body. In Total Recall, and following a trip to Rekall Inc. on Earth to have the memory of a vacation to Mars implanted in his memory, Doug Quaid discovers that he is actually Hauser, a member of the resistance movement on Mars. He returns to the planet to end the tyranny of chief villain Vilos Cohagen (Ronny Cox), chased by operatives who are intent on killing him. But on Mars, Quaid - and the audience - begins to question whether the adventure is real, or in fact an implant? Having already experienced Quaid’s dreams on the so-called red planet at the film’s start, and his visit to Rekall Inc. where he’s implanted with a spy persona, he could in fact merely be roaming in an electronic domain – his physical body connected to a machine that shows quite explicit violence and disorder surrounding and conducted by our hero. The film is an action-soaked narrative that shows Verhoeven’s skills as a director who commits chaos and disorder upon bodies – such as the ripping off of henchman Richter’s arms, various men and women being peppered with bullets, the drilling through of double-crossing cab-driver Benny, and a finale featuring expanding eyes and faces due to exposure to Mars’s atmosphere. Though using visual effects of a
more mechanical and practical basis – make-up, models and optical composites are to the fore — the film nonetheless presages the ideas of a character that becomes symbolically invisible (hiding his identity through implanting the Quaid persona) in order to perform the necessary actions of revolution. The film seems to end on a note of diegetic reality with Cohagen killed and Mars freed, and Quaid/Hauser kissing his action heroine Melina. But the notion that adventure is a dream, or more adroitly a sophisticated, implanted electronic memory/existence, continues with Quaid’s final words: “I just had a terrible thought... what if this is a dream?”. Though at times equally gory, *Hollow Man* manages to continue the idea of bodily disruption through VFX. But it does so using digital technology to displace Caine/Bacon’s body’s physical bearing into new spaces and ways of being received by the diegetic characters and the audience.

As a realm, cyberspace allows liberated movement through digital environments and is a world that fuses the biological with the digital, enabling the unseen space to be made contextually “real”, fusing the body with electronic and digital realms. Lev Manovich’s observations surrounding New Media, including digital visual effects, offers a bridge between the cultural form of cyberpunk and the digitised visual effects and character of the Invisible Man. Manovich says: “A new media object is subject to algorithmic manipulation. For instance, by applying appropriate algorithms, we can automatically remove ‘noise’ from a photograph, improve its contrast, locate the edges of the shapes or change its proportions. In short *media becomes programmable*” (“Language” 27 emphasis mine). This is an important idea to highlight, since the basis of this theory shows that media is a programmable entity that is highly mutable, changeable and (re)moveable in digital space. This echoes factors inherent within the aforementioned position of cyberspace congruent with VFX. The manipulability of digital media, its programmability and the capacity to augment image elements surrounding physical bodies (human and otherwise) draws the digital media, the cyberpunk body, and cyberspace together within *Hollow Man*, which uses CGI to remove, augment and replace the physical structure of Kevin Bacon. Within the film we see VFX artists switching his form out of the frame and bringing a new entity from multiple disparate and digital sources and domains in order to construct it. Furthermore, his invisibilised form – constructed in the film’s world through a combination of technology and biology, and
similarly visualised via effects - both diegetically and extra-diegetically - is now able to move at will. Here the cultural entities of cyberpunk, cyberspace and the manipulable aesthetics of digital CGI effects share and influence one another, allowing the terminology and theorisation to influence our understanding of the digital Invisible Man.

William Gibson is often seen as cyberpunk’s godfather, with Neuromancer (1984) viewed by Lawrence Person as “archetypal” and by Angela Bennie as the “noir prophet” of the literary movement (Person “Notes Toward”; Bennie “A reality”). But Larry McCaffery sees cyberpunk as an extant form that occurs outside of Gibson’s work, highlighting its presence within various media (such as music and television) and films ranging from The Hidden (1987), where an alien invader kills various humans and uses their bodies to hide, and Verhoeven’s Robocop (1987) featuring the physically and cerebrally augmented Officer Murphy (“Cyberpunk Controversy” 8). McCaffery also cites David Cronenberg’s Videodrome (1983), whose narrative features media broadcasts that psychologically intoxicate the mind, breaking down barriers between real and technological experiences and Blade Runner, where Rick Deckard hunts down sophisticated cyborgs in a technologically advanced world (Ibid.). Though written in 1988, McCaffery’s article is still just as relevant to the current chapter’s reading of Hollow Man. McCaffery writes “As with the emergence of any significant artistic movement, cyberpunk has found a means to mirror its era’s central motifs, obsessions, and desires (and render those concretely)” (“Cyberpunk Controversy” 8), which underlines the reason as to why cyberspace and digital media are reflected within Verhoeven’s film. Where Whale’s The Invisible Man can be read as an apt interpretation of the technological climate of cinema and culture within the 1930s, so Verhoeven’s production can be seen to reflect the late 1990s and early 21st century. Hollow Man highlights ways in which aspects of the digital world become housed in the VFX as an extension of the physical body, where digital process manage to free the performance from its analogue precept.

Using digital visual effects intermeshed with human performance – but a performance invisibilised through compositing and effects – aspects and ideas of cyberpunk and cyberspace become reflected and absorbed within Hollow Man. This is beyond the invisibilisation of bodies seen within Méliès’s films, since his output fails to
digitally remove aspects of his characters outside of the physical limits of the frame. Though he uses temporal and analogical techniques to remove and replace aspects of the body and to break down the physical world, Méliès’s analogue production prohibits his characters from moving beyond a locked down camera. Furthermore, due to the period of production, Méliès had no access to digital technology that allows what Manovich notes is a plasticity and elasticity previously available only to animation (“What is Digital Cinema?”). Such elasticity not only allows the filmmakers to remove and replace bodies, but to augment, adapt and reappropriate them through digitisation. This allows the creation of new digital entities that exist partly within the real world and partly within a digital, artificial domain. John Fulton skilfully used black matting to create scenes of invisibility in Whale’s 1933 Universal production, updating the black art process in Méliès’ films (see P. Cook “The art of invisibility”). But though able to produce more technically accomplished effects, the scenes were again reliant upon a fixed camera and the malleability of the human figure was limited to simply removing the character’s form from the frame. In order to achieve interaction with other elements and people, wires and mechanical effects were utilised (see Brosnan 72 – 73). The introduction and establishment of digital techniques discussed in chapter two highlighted how physical forms within the mise en scène could be more fluidly detached from the world and highlighted how invisibility could create a different form of realism necessary for a film’s content. Verhoeven’s Hollow Man furthers this establishment, but his film does so in another specialised manner. The film intermeshes digital technology’s inherent quality of plasticity with the similar, but also unsolidified historical stylings of cyberpunk, collapsing timelines and implementing a sense of disintegration and decadence within the film. Described by Stephen Connor as a combination of “technological hyper-development and decrepitude” (135), cyberpunk not only instigates a sense of the future, but also a sense of the past and of the disorder such notions produce, another facet of Bolter and Grusin’s notion of Remediation previously explored in chapter one.

With Hollow Man, the utilisation of the character is both a return to the past and a step towards the future, producing strong inclinations of cyberpunk’s intrinsic roots as well as the Invisible Man’s narrative origins. Hollow Man reworks the essential story of the brilliant, but immoral scientist featured in Wells’s The Invisible Man novel, setting
the film in a familiar technological world of irradiated serums, mechanical lab technology and a narrative that falls back on thriller conceits. But the use of digital technology to visualise the character reshapes the character, absorbing certain cyberpunk dynamics, such as the human body becoming interlocked with machines, producing a character that moves unobtrusively and almost visually unseen by anyone through a digitally nascent world beyond the real one. It is also of great import that creating this character also hinges upon the use of digital realms – of servers and computer technology, CGI and the unphysical.

_Hollow Man_, like cyberpunk in general, is not above using the historical and cultural contexts of its station. Connor points out cyberpunk pools antecedent generic tropes, such as detective fiction and _noir_, which allows a “choking [of] futurity” (135), showing possible future worlds that are familiar yet also futural (Connor Ibid.). Yet despite embodying a world that we can recognise as both existent, ahead of its time and often past, these worlds are always constructed as plays upon such spaces and times. As McCaffery says “What such criticism ignores […] is cyberpunk’s postmodernist spirit of free play (_jouissance_) and collaboration, its delight in creating cut-ups and collages (à la Burroughs) in which familiar objects and motifs are placed in startling, unfamiliar contexts” (“Introduction” 15). _Hollow Man_ follows a similar path, melding aspects of the antecedent Invisible Man “mythos” – its characters proclivities, the story’s dynamic interplay of voyeurism and alternating visibility/invisibility and scientific basis – with digitality and the future of technology.

The technology that is used to create Caine’s invisible, or partly invisible forms then – CG techniques and digital compositing –both erases and replaces the human body, producing a digitally augmented form that also has considerable free-flowing movement. Such melding not only shows us a future that is familiar, recalling the history of Wells’s character and other technological aspects of visual effects, but also skilfully plays with

---

45 In this respect the film itself houses such aspects through its diegetic world as separate, but somewhat reflective, or our own. As viewers we enter this world vicariously, experiencing aspects of the film psychologically, rather than actually, akin to roaming the Internet to play games, to talk with others as well as experiencing other recreational moments. Though we aren’t physically present, as users and spectators we dwell within the domains of cinema and the Web for certain durations and avail ourselves of certain similar aspects.
the character, the technology used to create him and the familiar tropes to show us something startling, unfamiliar and surprising. It is this interplay and use of digital technology and cyberspace motifs that shall be further discussed in the following pages. Scott Bukatman sees such a form as housing “Terminal Identity”, where it is “increasingly difficult to separate the human form from the technological” (“Terminal Identity” 2), and such an entity, along with considerations surrounding the digital world shall be at the crux of this discussion.

**Cyberspacing the Invisible Man.**

“Was I hallucinating? Because all laws of physics seemed to have been suspended.” – Nick Halloway, from *Memoirs of an Invisible Man* (John Carpenter (1992)

As noted earlier, Cyberpunk is a cultural form that has been in existence since the early 1980s, convened by critics as much as by the writers who worked within its midst. As Bruce Sterling states, “Critics, myself included, persist in label-mongering, despite all the warnings: we must, because it’s a valid source of insight” (“Preface” 343). Sterling sees its origins lying in both existent literary fields of science fiction and other “ancestral cyberpunk authors” outside of the genre, including Thomas Pynchon and William S. Burroughs (Ibid.). In outlining the formation of Cyberpunk, Dani Cavallaro sees author William Burroughs’s postmodernist fiction as a highly influential text. She says of *Naked Lunch* (1964):

> Gory, raw and for some readers, downright nauseating, *Naked Lunch* uses the theme of ‘the junk virus’ – drug addiction – as the starting point for a heady journey into the realm of abjection: the state of body and mind that renders certain objects and experiences simultaneously attractive and repulsive. (Cavallaro10)

Reading Burroughs’s *The Soft Machine* (1961/2010), a narrative that fuses the science fiction trope of time travel with the espionage thriller, using an often chaotic descriptive
prose, it’s possible to see in it aspects of the later cyberpunk genre and its development of the physical body as malleable. Burroughs describes the prospect of time travel carried out by the main character, Joe Brundige, almost metaphorically at first – mentioning the folding of a different day’s newspaper against another, so that they “form a time section montage” (“Soft Machine” 50). Following this, Burroughs outlines Brundige’s use of technology – film and soundtracks run backwards and at different speeds – in order that he can learn how to move back and forth, before he visits a Doctor who will transpose Joe’s self into the body of a young Mayan boy. The body - the malleable “soft machine” of the book’s title - is photographed and the adult and the boy are split down the middle, injected with a blue fluid of “heavy cold silence” before Brundige is fused with the Mayan. Burroughs’s Joe Brundige says, “I came back in other flesh the look out different, thoughts and memories of the young Mayan drifting through my brain” (“Soft Machine” 53), illustrating the freedom and concealment now found in this new bodily sphere. It’s a line that’s echoed by Gibson’s Case who, upon “jacking in” to cyberspace says:

A gray disk, the colour of Chiba sky.
Now –
Disk beginning to rotate faster, becoming a sphere of paler gray. Expanding –
And flowed, flowered for him, fluid neon origami trick, the unfolding of his distanceless home, his country, transparent 3D chessboard extending to infinity”.
(“Neuromancer” 68)

As in The Soft Machine, which relates Brundige’s outlook and his ability to move freely in the book’s world, concealed in a new body, Neuromancer’s Case also relates his viewpoint and the feelings it constitutes. In addition, drugs are an additional trope that appears in both Soft Machine and Neuromancer, with characters in each being involved in and often dependent upon addictive substances.

46 Interestingly, the irradiated isotope Bacon’s character is injected with is also blue coloured, and his body is – visually at least – torn asunder, his internal organs blasting out in plain sight.
Perhaps most importantly we have the way in which the bodies of characters also become fractured, made visually wretched and abject, torn apart and meshed with new elements. During the Mayan mission in *Soft Machine* Brundige prostitutes himself to a priest in order to re-program audiotapes that control slaves. The priest metamorphoses into a half-crab like creature (whose genitals ooze an “erogenous slime”), which Brundige then has sex with to gain access to the technology. Case on the other hand is in a world where he is linked to cyberspace through jacks that connect to his brain, and he flatlines repeatedly, risking his existence to become nothing more than a lifeless husk. It’s a status which has left some (such as Case’s mentor Dixie Flatline) as physically bodiless, his physical self made abject and worthless through death, leaving only their consciousness as a piece of sophisticated technology on a ROM disc. Similarly, the likes of Case’s bodyguard Molly are cyborgs, featuring mechanical technology and hard-wired chips that enable them to function more proficiently. Molly herself has extendable razors under her nails that act like claws, and a series of modifications that augment her reflexes and sight. Though less gaudily described than in Burroughs’s texts, Gibson nonetheless speaks about the claws and other additions in ways that denote the addition of Molly’s “tech” was paid for through prostitution, and one in which she was chipped and programmed to passively receive whatever service the customer asks for. Having no capacity to react, Molly was a puppet until waking during her last job and, at this point, Gibson writes prose that generates similar meanings to those of Burroughs’s earlier books. Mentioning blood, and inferring a sexually abusive interaction, and her shifting in and out of a different persona due to the chip, Molly relates how she violently finished off the patron, escaped her job, and took up another persona to survive. In both books we have characters that move into new personas, become invisible by disappearing in the real and electronic world, undertake violent action and have violence pushed onto their own bodies – both literally and metaphorically. Both Burroughs and to a greater extent, Gibson, create stories that place the characters in situations that have the body under aggressive, sometimes sadistic, assault.

*Hollow Man*’s VFX continues such features, with Verhoeven developing scenes that use manipulated computer codes to visualise an often gory and abject body as being both attractive and repulsive. As David Thomson notes “The reduction of the body of a
man to bone, muscular tissue and blood vessels as it shifts in and out of invisibility is strikingly beautiful, like a series of animated Vesalius drawings” (“Hollow Man”). During pre-production the visual effects artists set about researching medical illustrations and the work of a German anatomist Gunther von Hagens, who had created “plasticised” versions of human anatomy by injecting polymers into cadavers, and examining eighteenth-century anatomical wax sculptures in Florence (see E. Shay “Disappearing Act” 108). The wax sculptures in particular proved beneficial to effects supervisor Scott E. Anderson, who noted “They were more or less anatomically correct, but the artist had cheated the face […] tissues [and] materials to make them more expressive” (qtd. in Ibid.). The coloured wax was mixed and blended to produce “astonishing luminescence and depth”, and, together with Anderson’s notation that Hagens just kept the elements he wanted, illustrates how both he and the earlier sculptors produced not merely scientific representations of the internal body, but also stylised evocations that provided a spectacular insight for audiences (Ibid.).

As Caine is transformed from visible to invisible we see how the CGI artists’ research and effort produced similar ideals, with shots of the skin beginning to disappear from his torso and face as if being burnt away, revealing the anatomy beneath (see Fig. 5.1). Arguably this is fascinating, spectacular and quite staggering to see, whilst also being disturbing, mirroring both the expressiveness of the plasticised cadavers the artists had seen in Florence. Similarly, Caine’s later travails in which he is partly invisible – as he attacks Sarah and we see his body partially covered with blood – is again an unnerving and disgusting sight to witness, yet also enthralling. Caine’s CG honed physique glistens brightly under the deep red of the blood, catching the highlights of the stark illumination.
But, it is a form possessed of malice - one covered with an internal substance normally contained within the body and not on its surface. Here Verhoeven takes the concept of invisibility and pushes it to new debauched levels, reflecting Burroughs's accounts of the body and his ability to cut up elements of narrative and words. Butler says of Burroughs: “His work stands as an example of how far things can be pushed in terms of the boundaries of taste; it dealt with drugs, sex, and the end of the body” (13). Certainly there are apt similarities between Burroughs’s work and Verhoeven’s Hollywood films. Each not only push boundaries of taste, of what they can commit to paper and show on screen, but also how they create versions of things that have been seen before. Where Burroughs sought to inflect literature with a starkly different way of writing, less often seen in science fiction novels (of which Burroughs’s work can be seen as an adjunct\(^47\)) and general literature, Verhoeven forces a more visceral evocation of the science fiction film.

Working alongside and following on from Burroughs, other authors composed literary “mainstream” works (from Don DeLillo and Margaret Atwood amongst others) that in McCaffery’s words “portrayed individuals awash in a sea of technological change, information overload, and random – but extraordinarily vivid – sensory stimulation” (“Introduction” 10). McCaffery substantiates this viewpoint saying of cyberpunk “here we have a form whose maximal level of artifice and focus on the future permit it to jettison the familiar, the "correct," images, narratives, and implications that combine to produce the realistic illusions projected in most fiction” (“Cyberpunk Controversy” 10). Such a theorisation is equally located within Verhoeven’s work, since his oeuvre continually pushes similar limits, with characters in a world that is awash with substantial amounts of technology and toiling against villains who push vivid and stimulating conditions towards them. This is especially true within Hollow Man, with its scientist who self-administers a drug that bends the fabric of his own physical existence, ending his body’s normal being by making his corporeal self invisible and who then drives himself forward in a series of self-imposed “trials” to continue his work. The sights that show these trials are themselves similarly vividly stimulating, causing the other characters and watching audiences to sit up and take note.

\(^47\) In a 1964 interview between Eric Mottram and Burroughs, the author noted his work as “a new mythology for the space age” (11).
By visualising a series of violent and sexual exploits, where central characters commit actions that disrupt their body and psyche, Verhoeven and the film’s VFX arguably channel Burroughs’s and, moreover, cyberpunk’s generic issues. These are characters that jack in to systems in order to commit crimes, breaking various physical boundaries that regulate the world. Caine, like most cinematic scientists, is a character already fanatical about his work and as the film continues he becomes, like Dr. Frankenstein, Rotwang from *Metropolis* (Fritz Lang 1927), and of course Griffin from *The Invisible Man*, pathologically obsessed. Correspondingly, Cyberpunk heroes arguably become addicted to their digitised location and the actions they can commit. As Gibson writes in *Neuromancer*:

Case was twenty-four. At twenty-two, he'd been a cowboy, a rustler, one of the best in the Sprawl. He'd been trained by the best, by McCoy Pauley and Bobby Quine, legends in the biz. He'd operated on an almost permanent adrenaline high, a byproduct of youth and proficiency, jacked into a custom cyberspace deck that projected his disembodied consciousness into the consensual hallucination that was the matrix. A thief, he'd worked for other, wealthier thieves, employers who provided the exotic software required to penetrate the bright walls of corporate systems, opening windows into rich fields of data. (11–12)

An anonymous author on The Cyberpunk Project website compounds this understanding, stating that cyberpunk was originally a term for a character, a “young, technologically facile, ethically vacuous, computer-assisted vandal or criminal” (“*Cyber + Punk = Cyberpunk*”). Caine’s hollow man is still young enough to riff on such provinces, often acting like a teenager by subsisting on junk food and caffeinated drinks, working late into the night, driving both his sports car and his surrounding life in a fast and loose manner. When Linda asks how he came up with reversion breakthrough his answer is “The usual, coffee and Twinkies”, a flippant remark that echoes the ease with which cyberpunk characters seem to hack into protected systems. After becoming invisible, Caine’s actions become even more ethically vacuous as he conducts murderous acts in order to continue his new existence. Caine uses technology to vandalise his own body, invisibilising its
physical core in order to inhabit a world where his concealment allows him moral as well as literal freedom, becoming demonstrably criminal.

Cavallaro continues to explore cyberpunk’s roots, noting its history reaches beyond literary sources, with the word ‘cyber’ referencing science and the redefinitions this word brought upon science in Norbert Wiener’s book titled *Cybernetics or Control and Communication in the Animal and Machine* (1965). She notes Weiner assembled a series of stages to machine history, where they moved from the “golemic age” of pre-technology, through the seventeenth- and eighteenth-century “ages of clocks” and the late eighteenth and nineteenth centuries of the “steam age”, to the recent era of communication and control of cybernetics (12). Other authors have taken theory this up, including Donna Haraway, whose “Cyborg Manifesto” (1985) highlights how the concept of cyborgs – a cybernetic organism that is part man, part machine – features within the real world, not just within science fiction literature. Haraway sees cyborgs within medicine, where “couplings between organism and machine” are prevalent (150) and therefore that the cyborg “is a condensed image of both imagination and material reality, the two joined centres structuring any possibility of historical transformation” (Ibid.) Within *Hollow Man* we can see this continuation, as an establishment of the coupling between man and machine where material reality and imagination become fused in substituted human performance and CG effects that visualise the invisible character.

Cavallaro goes on to state: “Central to research in the field of cybernetics is the idea that, if the human body can be conceived of as a machine, it also possible to design machines that simulate the human organism” (12). In this respect, cybernetics is reflected through visual and special effects. As W. Ross Ashby says “Cybernetics deals with all forms of behaviour in so far as they are regular, or determinate, or reproducible. The materiality is irrelevant, and so is the holding or not of the ordinary laws of physics” (“Cybernetics” 1). As a consequence, it’s possible to see the ideas of cybernetics becoming transferred into the work of visual effects, which seek to build a sense of life and verisimilitude into digital objects and elements. Ashby highlights that though cybernetics relates to machines, it does not need the actual machine to exist in order for such concepts and ideas to be thought about and considered. Ashby positions cybernetics to geometry’s relationship with objects in the real world. Previously real world forms and
objects were seen as the most effective basis to dealing with geometry, and conversely any geometry not appreciably demonstrable in reality was deemed suspect. However he goes on:

Today the position is quite different. Geometry exists in its own right, and by its own strength. It can now treat accurately and coherently a range of forms and spaces that far exceeds anything that terrestrial space can provide. Today it is geometry that contains the terrestrial forms, and not vice versa. (Ashby “cybernetics” 2)

Cybernetics, Ashby says, is similarly based: “What cybernetics offers is the framework on which all individual machines may be ordered, related and understood” (Ibid.) Though Ashby highlights that in certain areas mathematical physics studies have hypothesised systems and practices that do not actually exist – such as springs without mass and particles with mass but no volume. Ashby continues, “To say that the entities don’t exist is true; but their non-existence does not mean that mathematical physics is mere fantasy; nor does it make the physicist throw away his treatise”, and it is this idea that I would argue visual effects refashions (Ibid.). In creating visual effects, filmmakers reverse the polarity, using the technology at their disposal to render the fantastical, the spectacular and the unreal into some kind of cinematicised reality. Though in a more rudimentary sense in relation to the greater scientific extent within which the field exists, developments in special effects are nonetheless able to create beings that simulate human organisms. Often visual effects accomplish this by visualising elements such as digital stuntmen, as discussed in chapter two. Hollow Man also takes advantage of such an idea, with digital effects creating a series of simulations of human organisms, stretching from the fabrication of human physiology through to the production of various kinds of transparent and semi-invisible forms that interact with the film’s world. Returning to Haraway’s Cyborg Manifesto, she notes:

Late twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally
designed, and many other distinctions that used to apply to organisms and machines. Our machines are disturbingly lively, and we ourselves frighteningly inert. (152)

The CGI effects in *Hollow Man* arguably follow such designations, with the digital feats used to render Caine invisible demonstrating an enhanced liveliness and vigour over the plain human performance of a pre-invisible Bacon, as well as Shue and other members of the human cast. Early examples include the visualising of Caine’s transformation into his invisible form, with the scientist’s body slowly disintegrating into transparency through stages that include the dissolution of skin, muscles and tendons, his skeleton and internal organs (see Figure 5.1). In this scene the dynamic motion of the digitally constructed body, partly based upon Bacon’s but significantly changed and augmented to produce the internal structures, is vibrantly presented for audience attention. Throughout, we become fixed upon the CGI, a cyborgic construct of digitally amplified body parts borne out of digital technology. Though still present on-set, and arguably important, Bacon’s performance becomes literally invisibilised. It is reduced and therefore somewhat inert, due to the imposition of the ultimately more active digitised body of his invisible character. Following this, further visual effects are used to show Caine in various states of invisibility across the length of the film, which follow similar precedents.

These include his interaction with physical objects such as the mask and clothing he wears during his escapades outside the base, such as a hooded top and sunglasses. Within these garments Caine remains hollow – or invisible – an effect created through Bacon wearing green coloured paint and suits over his face and skin that enables the effects artists to digitally remove the colour from the film and replace it with either an invisible void, and whatever lies behind that void such as the rear of the facemask Bacon wears. A further example is seen when Caine has electrodes attached to his invisible face to measure various data. In order to produce this effect, Bacon was costumed in green makeup and bodysuit, but also dressed in a lab coat and t-shirt on-set. During the shot co-star Josh Brolin then attached the electrodes to Bacon’s face and acted as if Bacon was invisible. In post-production the green of Bacon’s face is replaced by compositing in a portion of the background that he would ordinarily obscure, by taking a so-called “clean plate” which is simply a shot of the setting minus any actors or other elements. The final
shot is then a combination of these elements, which are constructed out of spatially disparate pieces, deviating from the ontological basis of the profilmic space as recorded by the film camera. Bacon’s body, and that of the celluloid film that houses it, is changed from its normal position and arrangement.

Caine is conducting experimentation that breaks apart a series of norms and standards – including both the fabric of the human body and its genetic make-up within the surrounding world. In addition to the film’s experimentation, the VFX follow similar parameters, producing an entity that breaks apart and reconfigures the body into a new displaced set of elements that differ from previous representations of invisibility. No doubt it can be argued that any VFX enacts breakages of normality, and indeed previous chapters have examined the ways in which various elements have been drawn together from sources both digital and analogue. The creation of Méliès’s work was often developed upon the assemblage of separate elements as described in chapter one, and digital technology allows the combination of multiple source materials from computer servers, software programs and photographed elements. But Caine himself is physically and psychologically changed, and in visualising his hollow form the visual effects transform both the creation of invisibility and its representation, producing an embodiment of narrative events.

In many ways Hollow Man sees director Paul Verhoeven developing further issues surrounding the body and the ways in which his films’ narratives engage the bodies within in order to change, disorientate, break and obfuscate them. Robocop is a

---

48 This is a theorisation explored by Lisa Purse in a chapter observing the so-called “action body” in Contemporary Action Cinema (2011), where audiences undergo a sort of Synaesthetic response to what is seen, inwardly and outwardly mimicking aspects of what characters’ bodies undergo on-screen in their own bodies (37 – 54). From this standpoint its possible to see such conceptions of invisibility offering us ways to connect to the performances of bodies, with characters who are built, augmented and invisibilised through digital means, but are nonetheless an on-screen embodiment.
film that doesn’t shy away from showing us a cop having his hand brutally shot off by criminals before he is turned into a cyborg (see Figure 5.2). In addition an unfortunate businessmen becomes target practice for the monster-sized robot ED-209, along with various other shots of graphic violence that show us distress and change upon the physical being. Verhoeven’s *Starship Troopers* (1997) similarly features characters with electronic limbs, others (such as lead Johnny Rico) becoming reconstructed by machines and complex scientific engineering, as well as a slew of human beings being slaughtered by the arachnid aliens. With the earlier *De Vierde Man/The Fourth Man* (1983) Verhoeven made a stylised thriller, about an alcoholic bi-sexual novelist in Amsterdam, who becomes the potential fourth victim of the femme fatale-like Christine. As a dry run for *Basic Instinct* (1992) and Catherine Tramel’s similarly potential killer, both films share a mixture of bodily subterfuge by their heroines, who lead the male characters on cat-and-mouse chases, seemingly addicted to playing high-stakes violent games of sex and death. More importantly, the films also visually dwell on the actions of Christine and Catherine. In each Verhoeven overtly captures the women’s bodily displays during sex, positioning their exhibition as both an addiction – for them as well as their male foils – and as a guise of invisibility; the physical spectacle of sex partly conceals their true character. Additionally the films’ physical violence – including a decapitation in *De Vierde Man* and the stabbing of a victim in the neck during *Basic Instinct*’s opening – demonstrate continued stress and disruption that takes place upon the character’s bodies. All of these films show Verhoeven disrupting the normal construction of characters psyches, their bodies and the surrounding narrative action.

This modern day Invisible Man is distanced from that of the past in character, because of similar actions committed by, but more often committed upon Caine’s body – and metaphorically upon Bacon’s body by the VFX - and the explicit visualisation on screen. As with previous Invisible Men, we are anchored to this protagonist, but he is a protagonist who has thrown off any pretensions to sympathy and antecedent qualities with which we can empathise. Instead Caine becomes as much an anti-hero as he is a villain; a confrontational vandal, who seemingly takes great pride in his various work, scientific or otherwise. Though technically sophisticated in execution, the visual style produced is somewhat reflective of the cyberpunk ethos, a form that Cavallaro (quoting
McCaffery), states, develops part of the punk ethos, where participants exploited “‘a willingness to use obscenity, “noise”, sensory overload’ and an emphasis on paranoia and ‘sexual and psychic violation’” (21). In part this is due to Hollow’s technical sophistication compared to the earlier film and less severe censorship, but it is arguably due to effects artists and the director being willing and able to produce such grungy spectacle as a means of exploiting the body within Verhoeven’s milieu.

Andrew Butler notes: “The power of computers to simulate environments is central to much cyberpunk, with the computer user jacking into this virtual environment or cyberspace by some means: through the spine, through eye sockets, through a chip in the head. The virtual environment liberates the protagonist from the constraints of his or her body, allowing them to take whatever form they choose” (14 emphasis mine). This statement proclaims the means by which the cyberpunk protagonist enters the virtual world and how he or she is able to choose a different form of their choice, and to be freed from normal bodily constraints. Arguably Caine’s Invisible Man pursues similar prospects, but more importantly the concept of entering a virtual world is inverted by having a virtual character constructed from a combination of CGI techniques entering the film’s diegetic real world. By becoming invisible Caine moves in ways his normal corporeal self could not. He develops a new, highly distinct form, yet the invisible formulation allows him to be concurrently indistinct and liberated from constraints. Akin to a cyberpunk hacker and indeed those real-life users of the Internet, Caine is scarcely seen, with only faint traces of his self, catching the attention of the spectator, allowing him to move freely through the film’s diegetic world both literally, and in other ways that allow him to subvert the moral codes of that world.

The digital construction and representation of such a form continues such ideals to greater distinction, since Bacon’s body is itself stripped apart, digitised and then put together by computers in a new form that is similarly distinct as the “other” of its original structure. As Andrew Butler notes of computers, “[They] needn’t just be limited to networks; sometimes individuals may be augmented by computers or other equipment – cameras, recording devices, receiving devices. The various types of augmented life – where the flesh is supplemented or replaced by the mechanical - are collectively referred to as the post-human” (15). Cyberpunk’s various heroes become so augmented, or
cyborgic, with the likes of Case in William Gibson’s *Neuromancer*, “jacking in” and moving freely around cyberspace, acquiring various pieces of cybertechnology through hacking. It is a metaphor than can be extended to the VFX work used in creating *Hollow Man*. Here the augmentation of Bacon’s initial performance through digital embellishments sees the actor’s original body made into an inorganic patchwork of elements. No longer is Bacon’s work only made up of his own body, but instead his corporeal frame is suffused with adornments. Some of these ironically make him invisible, or partially so, stripping away actual physical parts to create a digitised, post-human body.

Butler further notes that *Neuromancer*’s Case is “the master hacker, able to send his personality into computer networks”, but also notes, “he longs to leave his meat behind” (20). Such characteristics are certainly present within Caine who, as a “brilliant” scientist and egotistical megalomaniac, pursues the outcome of his research at the cost of his colleagues and his sanity - renouncing the normality of his visible and corporeal form to become invisible and incorporeal. Caine’s experimentations see him continually seeking answers to the mysteries of how to remove his body from visible space, plunging him and the spectators who view the film into a world that no longer recognises the human form in quite the same way as they would an ordinary and visible body. By absolving himself of a visually discernable physicality, Caine opens himself up to an existence where he can cheat certain social rules and become someone with a distinctly disruptive and malicious nature. Moreover, the visual effects technologies used in creating the character also display a series of characteristics that cheat rules of physical volume, spatiality, depth, plus other definable measurements and concrete conditions. As a construction of effects, Caine now moves through the world akin to cyberpunk “computer jockeys” and Internet users (Cobb); like Case he moves in a realm but cannot easily be seen in motion and the capacity to quantify such motion is very difficult to discern by those who wish to find him.

This differs from another example of the Invisible Man that also used digital visual effects, *Memoirs of an Invisible Man*, where the creation of the main character’s invisibility and its narrative implementation is much less disordered in both conception and realisation. The film, based on H F Saint’s novel, follows investment analyst Nick
Halloway (Chevy Chase), who becomes invisible following a freak accident at the headquarters of Magnascopies. The subsequent plot sees Halloway trying to evade capture by nefarious Agent Jenkins (Sam Neill), coming to terms with his invisibility and romancing Alice Monroe (Darryl Hannah).

The remainder of this chapter seeks to explore further how *Hollow Man* showcases digital effects that inscribe the main character with traits redolent with metaphors surrounding the body moving into a futuristic digitised era. Rather than utilising digital effects to establish mere invisibility, Verhoeven and company arguably utilise the paradigm of invisibility to demonstrate how they don’t merely remove the corporeal form, but take it apart in a way that promotes disorder of the physical. More than producing digital effects that situate us within the milieu of invisibility to show us actions that bend the fabric of physicality and basic ontology of the body, as in *Memoirs* and previous Invisible Man films, Verhoeven’s *Hollow Man* moves to wholly break apart these ideas. The film creates a character, not just invisible though digital effects, but through VFX that rips apart the character and absolves it of its roots within the real world. What remains is a metaphorical cyber-body – able to move at will and enact actions above and beyond those of any previous Invisible Man (and Woman).

**Producing the Invisible-Cyber-Man.**

In discussing cyberpunk Cavallaro observes: “The virtual interchangeability of human bodies and machines is a recurring theme in cyberpunk and intrinsic to its representation of cyborgs” (12). In creating the *Hollow Man*, this idea serves as a good figurative explanation of the creation of digital effects and their placement within the film. Though not a literal cyborg, the creation of Caine’s Invisible Man draws upon certain aspects of the cyborg as highlighted above. Because it is through the combination of a human performance, the process of its digitisation, plus the use of CGI and other digital effects, that we see the melding of man and machine(s) to create a new cyborg entity. Creating the leading character of *Hollow Man* involved a series of digital mechanising techniques that revolve around displacing and relocating portions of Kevin Bacon’s body and his performance into and onto digital structures. What remains is a character that is an
interchanging amalgam of physical and digital mechanics, where the body is released and able to enact actions not open to the human performer.

The creation of organisms is, Cavallaro notes, crucial within Cyberpunk narratives, since “any organ can be lifted out of the body and replaced with a brand new one” and body parts are incessantly traded on the black market (14). Personas are similarly transferred, with Cavallaro stating, “people actually change their identities as easily as we would change our clothes. The computer scientist and robotocist Hans Moravec believes that in the not too distant future it will be possible to transfer mental functions to computer software” (15). Certainly this precedent can be seen within the visual effects produced for many films, with Hollow Man ideally serving this purpose. Within Hollow Man the software programs used to drive the animation of the character were developed upon simulating the motion of a human organism, as well as simulating interaction with various atmospheric effects. During the creation of Caine’s cinematic invisibility, aspects of Bacon’s physique are made absent via software that places such portions out of sight. The effects artists developed a system from the software program Maya to create a muscular and skeletal system that simulated the movement of the human form (E. Shay “Disappearing Act” 108 – 112). Using Bacon’s on-set performance as reference material (as seen in Fig. 5.3 for example), the filmmakers shot many scenes using a computer-controlled camera that then allowed them to re-shoot the set-up identically to the one previously photographed. Senior Visual Effects Supervisor Scott E. Anderson relates: “We said: ‘We’ll take the live action plates with Kevin Bacon in them, we’ll animate our Sebastian to Kevin’s performance, then fix all the problems. We’ll fix all the holes, fix the backgrounds, and so on.’ Of course, that led to motion control, special make-up and suits for Kevin” (qtd. in E. Shay “Disappearing Act” 112).
Cavallaro notes of author Bruce Sterling’s work that his “fiction develops the motif of physical transformation through the development of intrusive technologies” (16). In addition Sterling himself notes of his and others’ work: “Certain central themes spring up repeatedly in cyberpunk. The theme of body invasion: prosthetic limbs, implanted circuitry, somatic surgery, genetic alteration” as elements of cyberpunk’s keynotes (“Preface” 346). Within most, if not all Invisible Man narratives, the significant issues Sterling highlights can also be seen at work. Both the various scientists’ serums and processes, and the special effects artists work, manage to invade the body in order to make him or her invisible. The various scientists achieve this by the introduction of the aforementioned serum, or an experimental process, which occupies their physical form and creates invisibility. The effects artists “invade” by using digital technology to swamp and engulf the performer’s physical body, using CGI to integrate and release the visible physical matter and replace it with a new digital version. In previous films, such achievements entailed the use of costumes that would obscure the person’s body – whether through bandages and normal clothes, or more fully by using a black suit and head covering that would allow the head to be removed when photographed against a black background. Such a system is still used in part in Hollow Man, with a mixture of blue and green suits but mainly shot against a regular backdrop. In this more recent iteration, the effects artists are more fully prepared to occupy and infect the performer by figuratively fragmenting the performer’s nominal occupation of the scene. By using digital compositing, the effects artists now remove the on-set actor entirely, leaving only the transparent form that audiences look through. But, though previously undertaken in films using both optical and digital effects, this new invasion
often leaves none of the visible actor in place, only what they interact with and in addition replaces them with a series of CGI elements.

Whale’s *Invisible Man*, as well as subsequent Universal sequels and more recently *Memoirs of an Invisible Man*, have embarked upon similar practices. But the particular use of digital techniques in *Hollow Man* allows for a different and more thorough approach than *Memoirs* in visualising the invisibility and interaction with physical aspects than previously seen. As Chevy Chase’s Nick presents himself to Daryl Hannah’s Alice in *Memoirs*, we are not so far removed from the same scenes of Griffin removing his bandages within Whale’s film (Figures 5.4 and 5.5). The extent of the scene’s technique is similar, requiring the use of some form of physical masking of the performer so that they can be erased from the plate (Cotta Vaz and Duignan 172). Here optical compositing is switched for digital compositing and digitally controlled cameras. The latter allowed for a more seamless integration of the elements since the combination of the elements via a computer did not require the film to be photographed, which upheld quality compared to optical compositing.

One of the major technical differences between Whale’s film, its sequels and these more recent productions lies in the greater capacity to more seamlessly remove elements from a live-action plate, and in the greater dexterity of image manipulation. Rather than filming a separate shot of the performer within a similarly coloured stage and then optically compositing this into a live-action shot, filmmakers could now shoot the performer wearing a suitably key-coloured mask or suit and then digitally remove it (Fig. 5.3). Previously it was far more difficult to achieve a character interacting with other
physical elements, such as a shot of Griffin removing his bandages in front of a mirror.\textsuperscript{49} The separation of physical settings and performer used to achieve the cohesive final whole used far more protracted and difficult physical and optical techniques, the latter of which allowing no movement of the camera and scant motion of the character himself. Anything that involved the interaction of a moving Invisible Man, or his interaction with people was also dependent upon separate physical props. A good example is when Griffin rushes from the village by stealing a bike – which involved the use of a bike held aloft and pulled by wires – and the passage of Griffin in the snow – which used a series of cut-outs in the stage floor which were dropped away to give the impressions of Griffin’s footsteps\textsuperscript{50}.

With \textit{Memoirs}, visual effects artists could shoot a performer wearing the necessary key-colour on the normal set or location and, using a computer controlled camera, re-shoot the scene’s set-up which provided the clean plate. Anything blue could be optically removed and if the character was interacting with another object – such as when Halloway plays tennis – the various objects remain in shot, appearing more naturalistic. As Cotta Vaz and Duignan note “Digital manipulation allowed the visual effects artists to create invisibility as a three-dimensional reality – the viewer can actually see the back label of the shirt and the inside of the sweatband when worn by the invisible character, or the surrounding court and hedges through the invisible legs, arms, and head” (171). Computers are used further to digitally represent elements that are seen through Nick’s invisible form by recording the items separately, but then re-inserting them as a digital animated element that tracks with the rest of the invisible form (Ibid.).

\textsuperscript{49} The shot required four separate negatives to be used. First, a negative of the wall and the mirror was taken with the mirror masked off by black velvet. Second, the opposite wall was shot to form part of the mirror’s reflected space. Third, special effects supervisor John P. Fulton and crew shot the invisible man unwrapping his bandages from the rear. Lastly, the crew photographed the front view of the unwrapping, which would complete the reflected image. The shot required very careful planning, since the action and perspective had to match perfectly. Indeed if the actor wearing the invisibility suit crossed over any part of his body the effect would be spoilt by a hazy ghosting effect. All of these negatives were optically composited, with each element married together to produce a seamless whole (Details taken from Rudy Behlmer’s commentary on The Invisible Man DVD).

\textsuperscript{50} For more information, see John Fulton’s account in “How we made The Invisible Man” (117 – 120).
Such effects allow a greater dexterity in visualising and using the character than previous Invisible Man films, but these methods and the way in which Memoirs uses visual effects to develop the character and narrative are still comparatively rooted to physical components. This is partly due to Memoirs’ production taking place during a period of transition in visual effects, when optical and practical effects were beginning to be superseded by nascent digital techniques. Though digital effects are used within Carpenter’s film, a number of optical effects were also in place to drive the visual thematics of invisibility. The Magnascopics building, site of the accident that makes Halloway invisible, is also caught up in the condition and becomes ripped apart and left partially visible and partially invisible. Though an actual building was used in filming the majority of the early pre-accident scenes, later moments as Halloway wakes up to discover its fractured state were produced through an elaborate set that hid structural supports, whilst longer shots used a model and matte paintings (Figs 5.6 and 5.7).
When shot from the correct angles, the large sets of the building appeared to have significant portions of walls, windows and floors that had become invisible or partly invisible, but this was an effect not created through digital or even optical effects but often through an art that goes back to those used by stage magicians of the late nineteenth century.

An example would be that of Stodare’s The Sphinx illusion, which involved an apparently mummified head in a box atop a table being brought back to life. The illusion was performed upon a stage within a theatrical environment and was dependent upon sightlines and safe zones\(^{51}\). The box brought on stage was in fact empty and a performer, already concealed underneath the table, would put his head into the box and come to life on cue. Mirrors, set under the table at forty-five-degree angles produced the seemingly decapitated head, allowing it to answer questions and make eye contact with the audience. The performer’s body was hidden by the mirrors, which reflected the surrounding stage (see Christopher and Christopher “Illustrated” 157 – 159 and Steinmeyer “Elephant” 83 – 86). Memoirs takes this technique into cinema, finessing the mirror technique with the advantage of much greater control over sightlines and safe zones through the use of editing and framing which directs spectators viewing of the scene much more carefully than when on stage.

On a similar level, the creation of Halloway as invisible or partially invisible is still dependent largely upon Chase, or another human performer, being clad in the correct coloured suit and then partially or entirely erased by the effects personnel. A late scene where Halloway is disguised as a taxi driver, wearing a kaftan, make-up and hat shows him forced to strip away his clothing in order to disappear once more. Following the removal of the clothes, Halloway is left invisible but for his face, still caked in make-up. As he runs down the street fleeing his pursuers, passers-by observe his apparently floating head. The extent of his invisible torso was realised by the use of Chase dressed in

\(^{51}\) As noted in the opening chapter sightlines are “imaginary extreme lines of vision, the boundaries of what an audience will see or what they will be prevented from seeing” (Steinmeyer “Elephant” 80). Jim Steinmeyer continues to note that they must allow the audience to see the action on stage, but should not allow a spectator to view stagehands, the mechanics of the illusion, or indeed any concealed performer (Ibid.).
facial make-up, with the rest of his body in a blue suit\textsuperscript{52}. Though using digital technology, it was therefore dependent on the physical body being filmed performing the majority of the necessary information on a separate stage. Though still requiring quite sophisticated techniques, due to the motion of Halloway within the scene as he runs down the street, the movement of his invisible body through digital processes is limited and the presentation of the effect advances little beyond previous examples, such as Griffin in Whale’s \textit{Invisible Man}. Often \textit{Memoirs} restricts views of the invisibility of the character to static shots, or if the camera does move, its motion is limited.

The visual effects artists often steer their way around such motion by separating the visible, apparently visible, and partially visible. One such example occurs when Halloway washes away the taxi disguise facial makeup, leaving his form glistening from the water used. This was achieved by shooting separate elements of Chase, wearing black coloured coverings and black “wet-look” make-up on a blue-screen stage and then optically and digitally extracting the highlights from the shot to create the reflective shimmer. Chase could run through the blue-screen stage and this motion could be matched to a camera panning, produced on location as a background plate. Chase’s form was then placed into this plate via compositing to produce the illusion of movement within the real world. Another even more innovative effects shot shows Halloway turning to suddenly discover the digestion of recently eaten food reflected in a mirror. The shot, consisting of a pan towards the mirror, also contains Chase’s Halloway as a visible character – a trait often used within the film - and the mirror has a definable frame. This allows us to see and focus on Halloway and follow him through the pan as he moves in order to see the mirror and the food’s reflection. The food however remains reflected and motionless within the mirror without, of course, the rest of Halloway. It is an effectively simple realisation of the effect, since the food element can be dropped into the framed area. Due to being contained within a frame the effects artists can simply shoot the scene without Chase and composite the reflected background and the digitised food mass into the shot. The audience’s fixation on the “visible” character and his movement means they

\textsuperscript{52} Chase wore the Kaftan on top of the blue suit and performed in front of a blue screen in a studio, removing the Kaftan and then running on a treadmill. This was then composited with the location footage of the San Francisco Street, with the various extras and actors reacting to directions as if Halloway were rushing past them.
are less liable to notice that the reflected matter does not move as if within Halloway’s body and the mirror frame is a definable area which can be locked off and worked on by the artists without encroaching upon the rest of the shot. It is therefore relatively uncomplicated in comparison to showing the food’s movement or a more complicated combination in an un-framed area. Such cheats allow the apparent invisibility to seem realistic, but in actuality the movements are quite simplistic (if occurring at all) and the actions developed by such processes seem stilted and ungainly compared to what Wells’s literary Invisible Man is able to do.

Even the most complicated and fully digital effects produced for *Memoirs* – of Halloway and Alice’s conversation following her painting his face with make-up – is a visualisation that is pre-figured upon data performed elsewhere by Chevy Chase. Chase wore a blue balaclava that revealed his face, and a blue smock over his upper torso, as well as blue contact lenses over his eyes and a coating on his teeth. Chase had his face painted in a very exaggerated fashion, mirroring the make-up applied by Alice from her kit. He was then photographed in front of a blue screen and digitally extracted leaving just the presence of the made-up face, with invisible eyes, teeth and body (Fig 5.8). This was then composited into a live-action plate that featured Hannah’s performance. In addition, the filmmakers produced the character’s dialogue by scanning Chase’s face into a computer, with the actor making key frame positions saying specific vowels. Occurring before motion-capture technology existed this process produced key frames that were then used to enable animators to create the necessary dialogue by manipulating the
extracted mouth area to facilitate the scene’s verbal exchange (from “How to Become Invisible”). These are visual effects that remain more closely locked to foundations of the body, plus the physically dependent mechanics of technology, with little exchange between the physical basis of the performer’s body and the more unbounded motion permitted by digital techniques. The effects within Memoirs of an Invisible Man are built upon optical processes using mechanical cameras, glass lenses, and their capturing of Chevy Chase’s performance on film, as well as the optical compositing used to create the effects. Though digital techniques are in play, the burden is weighted towards the mechanical. Therefore they are far more removed from aspects of cyberpunk and cyberspace. Here, Chase’s Invisible Man is still more attached to the real world, and fails to move very far beyond the confines of a studio and its surrounds. Though the film ushers in certain digital features, it remains far more demonstrative of optical effects, and analogue based media forms.

Perhaps, due to Memoirs being an early exponent of digital technology, it is still situated in the photographic world that cinema was born from. But, this last example from Memoirs demonstrates the foundation of what digital media can achieve. It returns us to D. N. Rodowick’s discussions on digital imagery and its complicating problems already present within cinema to an even greater degree. As previously noted Rodowick remarks that cinema has already moved beyond the autographic arts (that is the art of signature, such as painting), and the allographic arts. Cinema cannot be wholly original due to the reproducibility of films for distribution, and therefore becomes an imitational form (15). Furthermore the question of who is the author, Rodowick asserts, continually vexes and complicates matters of creation. Concluding, “as in musical composition, all [authors] are displaced in space and time from the actual performance of the film” (Rodowick 14). Digital images move beyond this, since in Rodowick’s view, they are “synthetic”, therefore not a physical action of an author’s hand, and do not result in an end product. The elements of Memoirs outlined herein move towards such artificiality, since the majority of the effects used to create Halloway’s invisibility use some digital synthesis. The creation of Halloway’s painted face resides as a product that does not truly exist in the real world, because it exists as a piece of celluloid and animation, developed from a computer. Though Chase was photographed, and his physical face used to
establish the rudiments of the scene, it was a physicality that was detached, partly
digitised and recombined with other synthetic elements in order to complete the final
instance. This follows the basis of Rodowick’s interpretation that digital imagery stands
upon its capacity to be “easily reworked, reappropriated and recontextualised” (Ibid.).

Rodowick’s primary discussion is founded upon the ways in which digital
imagery stands apart from the analogue origins of film, that digitised images are
distinctly different both in form and in what they can and do achieve. But the author
notes that the ideas of film theory, and therefore aspects of analogue film, are still
important in the discussion of digital imagery:

[The] material basis of photography as well as film is a process of mechanically
recording an image through the automatic registration of reflected light onto a
photosensitive chemical surface. The time of exposure effects a transformation of
substance in which time, light, and density are directly proportional. The resulting
image is analogical, defined as a direct and continuous transformation of substance
isomorphic with the originating image regardless of scale. (Rodowick 48)

Here, the author sees photography and filmmaking as a mode of existence that is split,
fluctuating between presence and absence, and present and past, creating a virtuality that
presents time as spatially present (56). But it is furthermore “space past” (Rodowick 65,
author’s emphasis), an historical representation of aspects already distant. Rather than
presenting a world of divided perceptions, as Rodowick says, split by temporality and
space, but nonetheless transcribed, digital imagery aspires to conceal and complicate this
by nullifying the process of transcription (64). Rodowick goes on: “In digital
photography, the spatial link of physical causality is broken as well as the temporal
continuity of the transformation” (117), but within Memoirs the creation of the digital
imagery is still heavily reliant upon the analogue transcription of Chase, caught spatially
and temporally through photography, alongside its augmentation by digital means. In the
painted face scene, Chase must first be optically captured, and this is then only partly
transferred to a computer in order to complete the scene. Though the final imagery is
indeed reappropriating and reworking imagery, that imagery is still partially analogical and physically based using still photographic means and hand animation. This complicates digital imagery’s position within Memoirs. Though Rodowick sees the impact of digitisation as the ontological “unbecoming of photography” (124), the photographic is still present within Carpenter’s film due to its continued use of optical media. It is a factor that pervades the entire film’s narrative, its characterisation and its stylistic choices. Though Carpenter produces a film that references invisibility, the inherent and underlying principles of what invisibility can achieve, and what digital media can accomplish aren’t truly present. Invisibility means to be unnoticed and unseen and with that comes the promise of breaking free from principles governing the seen, the physical, and furthermore the established norms of analogue cinema. As Wells’s original Invisible Man, Griffin is ultimately - and obviously - an analogue being and character. In his physical state he is able to make use of the diegetic skill of the period, and exponentially this is mirrored extra-diegetically by the VFX practitioners. His visualisation in Whale’s 1933 production and the subsequent Universal sequels uses a methodology that is grounded within the real world and physically analogue technologies. Though he is invisible and able to move in certain directions and be visualised in certain ways, the analogue world only has the capacity to move in certain dimensions and temporal directions. Digital technology conversely allows a far more flexible approach to the repositioning of the matter that ultimately makes up the frame. It’s an objective that digital technology tries and, in the case of Hollow Man, often succeeds in using to great effect, repositioning and revisualising the invisible and semi-invisible body in a variety of radical positions and locations, literally opening it up to cyberspatial interpretations.

Audiences, ironically, always need the Invisible Man to be established in some way. At the very least Claude Rain’s mellifluous voice anchors his character as present within most scenes in which the filmmakers were required to show him, despite his transparency, more often it’s through the visual and special effects. At times this is a narrative necessity, at others a form of spectacle and often an engagement of both. But previous technology meant that the filmmakers could only do so much with these scenes. Though Griffin strips away his bandages (such as when he stands before the mirror in
Kemp’s house) and his clothing, and at one point, rushes away through the village, other instances show the invisible form as practically immovable or tethered to Earth. Griffin’s becoming invisible at these moments is often visualised through locked off shots, where the camera frames the performer so that the effect can be achieved. To move the camera would prohibit the correct registration of the various elements to seamlessly fit together. Though Griffin might move, he does so in a static frame and often the form is more visible than invisible – partly dressed until the last moment. Similarly, any effects that might show Griffin interacting with other objects – such as the bicycle he escapes on, or his killing of Kemp – use wires to hold the object up, or the performer himself reacting as if being strangled.

Again, these moments express the cultural and temporal position of the film, which is both made and set in the 1930s, a period still mechanically and analogically based. The motorcar in the United States was still in a relatively early stage of commercial production, having begun around 1914 by Henry Ford. Similarly, Alan Turing’s foray into the theory of digital technology was still three years away from fruition. Cinema had made the leap from non-synch to synch sound production less than a decade before. As D. A. Cook notes, only when post-synchronisation of sound was introduced in 1931 and the sound-on-disc and multiple camera format had been abandoned did cinema begin to move more freely (271). Blimps and dubbing practices “reintroduced the plastic, manipulative element” which cinema had achieved by the late 1920s. But the use of special effects was still stymied by a necessity of locking the camera down in order to create the optical effects. Because scenes of the main character undressing to reveal his transparent self had to be shot on a separate blacked out stage this limited the camera, the actor, and intrinsically the body’s, movements (Brosnan 71 – 72).

In *The Invisible Woman* (A. Edward Sutherland, 1940), similar precedents are followed, reflecting a number of cultural aspects from the period. The film, which has little connection to Whale’s original, save for a person becoming invisible, sees eccentric Professor Gibbs on the crux of creating a machine that will create invisibility. Funded by an almost bankrupt playboy industrialist named Dick Russell, the Professor advertises for a test subject and hires a recently fired department store model, Kitty Carol. The machine
proves successful, and Kitty takes advantage of her new abilities to take revenge on her rude boss Mr. Growley before returning to the Professor and the playboy, who takes a shine to Kitty. Meanwhile, a gangster holed-up in Mexico learns of the device and steals it with the hope of using it to sneak unseen back into America but, unable to get it to work fully, he has Professor Gibbs and Kitty kidnapped, leading to a showdown between Kitty and the gangsters (with little help from Dick), and the rescue of the Professor. At the close of the film Kitty and Dick have married and become parents of a child that also has invisible abilities.

Seeing the film today, a number of cultural and social reflections flow from the narrative and visual design, through the representation of characters. There is the use of a mechanical device (over chemicals) to produce invisibility, which partially foreshadows Hollow Man’s inclusion of computers to calculate the necessary formula for Caine’s irradiated serums. But more importantly the Professor’s large device (which fills the majority of his laboratory) highlights the onset of mechanical construction and devices in the twentieth century, in which the film is set. As noted earlier, physical technology was used by the special effects department to create the effect of invisibility, involving a black velvet costume against a black set, and the interpolation of the footage by an optical printer alongside background plates. In addition, wires suspending objects, performers pantomiming interaction with the invisible character and other physical elements echo the state of visual effects and the use of performance at this time.

A refinement of John P. Fulton’s work in the first film, their use is based on a combination of physical, mechanical and optical techniques that stamps the effect onto a piece of film. As a reflection of the then state-of-the-art in media, it was – though lower in budget – nonetheless a strong showing in audio-visual technology. Instead of the rather rustic, provincial first film (and its sequel, Joe May’s The Invisible Man Returns (1940)) with its turn of the century evocation of English village life, the sequel is set in big city America, with characters similar to those seen in screwball comedies of Howard Hawks’s Bringing Up Baby (1938) and Leo McCarey’s The Awful Truth (1938). Kitty Carol and Dick Russell are both fast-talking, savvy characters who are abreast of the current American climate of commercialism and career orientation. Kitty’s a single career gal looking to further herself and not be seen as a clotheshore to be pawed at by her boss.
Dick is a playboy living for the moment and paying the price, perhaps in reflection to the hangover from the economic woes suffered by the United States and the world following the 1929 Wall Street Crash. The hustle and bustle of city life, technological development, including the formation of the first commercial computing device, ENIAC, and the surge in popularity surrounding entertainment, clothes and other consumables to come, are foreshadowed.

Though the cinematicised black art was a visually reduced version of stage techniques that concealed and revealed performers and objects, the mechanics and methodology used was still considerably bulky. Though obviously little of the invisible body is seen onscreen – the transparent body of Kitty, though sometimes partially clothed, is often not seen at all - the use of blacked-out staging and particularly the optical printer, makes for a considerable physical apparatus. This aspect is reflected in Professor Gibbs’s own invisibility machine, which fills his workshop and looks quite similar to the ENIAC computer developed soon after (see Figures 5.9 and 5.10). As Martin Weik says:

By today's standards for electronic computers the ENIAC was a grotesque monster. Its thirty separate units, plus power supply and forced-air cooling, weighed over thirty tons. Its 19,000 vacuum tubes, 1,500 relays, and hundreds of thousands of resistors, capacitors, and inductors consumed almost 200 kilowatts of electrical power. (“The ENIAC Story”)

In comparison to modern effects techniques, the optical printer and associated materials that were necessary to process the visual effects are certainly physically monstrous.
Though *Hollow Man*’s effects also required large mainframes to organise and produce the effects of invisibility, the processing power contained within them is considerably greater. Comparatively speaking, the level of mechanics required to produce invisibility in modern films is ever more reduced.

Though Weik goes on to stress that ENIAC “was the prototype from which most other modern computers evolved” (Ibid.), the development of microprocessors facilitated fractionally smaller devices to achieve computation. In essence, modern invisibility can be produced on a virtually imperceptible scale of technology. Of the IC (Integrated Circuit) microchip Saxena notes that all of the necessary componentry is etched and then adhered onto on a very thin layer of silicon, creating an integral solid (4). Its spatial diameter is considerably smaller than both its forebears, the vacuum tube and capacitor (Figure 5.11), yet more importantly the level of processing power contained is vastly greater, with modern chips containing over a billion transistors (Clarke).

Aside from mechanical and technological reflections, Sutherland’s film also reflects some sense of social prosperity for women in America. Theatrically released right in the midst of the Second World War in 1940 (but prior to America’s engagement) *The Invisible Woman* shows not just the aforementioned beginnings of consumerism after the Depression and women’s partaking within it, but also the start of women being a stronger part of the labour market. Though Aja Sorensen notes men (and indeed other women) were often against the influx of women into the general workforce, female workers were in existence long before the 1930s and 40s (“History” *Rosie the Riveter: Women Working During World War II*). But women in America (as in Britain), would soon begin to take on the jobs of men now in military service and though it would be
another year until “Rosie the Riveter” became a well known term, the idea of women joining the workforce was now not just a growing trend, but one that crossed classes (Ibid.).

If Kitty’s job as a department store model isn’t the height of employment and somewhat sexist, her later success in gaining better working conditions for her colleagues using the gift of invisibility to scare Mr. Growley into being a better, less chauvinistic boss is quite proactive. Furthermore, Kitty’s deeds show her as being much more active than Dick. Kitty not only manages to outdo her boss, but like so many other cinematic woman of the time (and Invisible Men of the past and future), she’s able to do more of what she wants. Often ignoring the befuddled Professor, Kitty goes out on her own to actively have fun. She keenly makes Dick’s hapless butler believe Kitty’s a ghost, woos the admittedly not too difficult to romance Dick (but retains her brassy edge), and ultimately defeats the gangsters. And she often does this without resorting to being the inactive and passive character of Mulvey’s gaze theory (“Visual Pleasure and Narrative Cinema” 746 - 757). Though this active body is not without compromise since, when invisible, the character is naked, a fact Kitty is constantly mentioning. It’s highly probable that the producers focus on this by placing Kitty in situations which allow audiences to imagine just what Kitty might appear when naked, especially when she journeys with the Professor to Dick’s lodge and gets soaking wet en route from the car. Though dressed in a dress and a veiled hat, she is asked to change outside the lodge and we then see her clothes being laid out above a fire. The nakedness and scopophillic gaze is furthered by Kitty’s display of her legs to Dick by pulling on a pair of stockings in order to illustrate her attractiveness. Furthermore, like so many other similar films of the period (Irving Rapper’s Now Voyager (1942) and Max Ophuls’s Caught (1949)) the freedom of the central female protagonist ultimately concludes with her brought back into the fold of prescribed femininity. Kitty ends the film being married to Dick and has given birth to a baby boy, albeit one who can himself become invisible.

Despite the disparity in time and technological advances, Carpenter’s film follows similar lines, perhaps in homage to Wells’ novel and Whale’s film, but also (arguably) due to the infancy of digital effects the film reflects the period of its making and surrounding culture. Already having remade *The Thing From Another World* as *The
*Thing* (1982), and made homages to other filmmakers’ work (including Alfred Hitchcock and Howard Hawks), it is highly likely that the exacting details of certain shots in *Memoirs* were referencing Universal’s original *Invisible* films. These include the revelation of Halloway’s invisibility to Alice – where his apparel consists of medical bandages, ornate dressing gown and scarf, and old-fashioned goggles with dark lenses (Fig. 5.5). Similarly, shots where Halloway interacts with other objects or people are often fashioned upon moments that very closely or directly reference earlier Universal productions. These include Halloway smoking a cigarette whilst speaking to Alice (akin to a scene where Griffin speaks to Kemp), and scenes where Halloway manhandles people whilst invisible – such as the drunk he uses to hail a cab to return to San Francisco and the escape from Agent Jenkins’ office. These mirror moments from Whale’s film, such as when Kemp is dragged from the car during his murder. As with the scene involving the drunk, and Halloway’s escape using Jenkins, the actors all perform as if being jostled and physically coerced by an invisible entity. Little digital or indeed optical work is involved here, with Whale’s film using wire and rigs to pull clothing and drag the actor playing Kemp from the car. Similarly as Halloway uses Jenkins as a hostage the effects consist of a gun attached to Sam Neill’s head via a concealed headband – the effect of Nick’s force is all from the actor’s performance and the opening of doors by concealed operation. Furthermore, Carpenter’s film playfully adjusts the concept of invisibility to orientate us to Halloway’s point of view. We not only see invisibility through visual effects, but the problems Halloway has in eating and moving through a world were he still believes he is visible. Consequently we not only see people’s reactions to being run into by a person who thinks he can be seen, where performers fall over and objects are thrust out of the way by unseen forces, but we also share this belief by seeing Halloway as a physical entity within many scenes creating an empathetic link with his situation.

Such effects are used in *Memoirs* because they work most effectively (and cheaply) within scenes. But Carpenter’s film presented the character as more analogous to Chevy Chase’s previous comedic roles – such as *Fletch* (1985) – that has the star romancing his way through the narrative, using a series of perfunctory disguises and/or becoming caught up in slapstick routines to complete the narrative’s charge. As film, it’s
a departure from H F Saint’s novel, which has Halloway using his skills as an analyst to work the markets through telephony and computers (allowing him to work for a living invisibly). Furthermore, it makes little use of situations from the novel where a woman he moves in with mistakes him for a ghost. Such devices would thematise the malleability and elasticity of the invisible form, both literally and figuratively, but the script only scratches the surface with two brief scenes referring to séances and ghosts, and a scant indication of Halloway working the markets towards the film’s close. Instead the film is chase orientated and rather mechanical – both in plot and in the effects used to depict his evasion of his pursuers. The majority of the visual effects utilise optical and mechanical effects, or resort to physical performance – such as when Halloway controls a drunk to hail a taxi and coerces Agent Jenkins with a gun to his head to escape. Both of these scenes rely on the profilmic presence of the onscreen performer, sometimes placing Chevy Chase in the scene along with Sam Neill, and Barry Kivel, who plays the drunk. The majority of this action relies upon Neill and Kivel’s characters to act as if being coerced or hauled by Halloway. Similarly, the use of a mechanical treadmill with Chase running in a blue costume and blue screen in combination with the moving shot of a San Francisco street falls back on a grounded ontological basis. The use of optical and digital manipulation allowed the filmmakers to make Chase’s body invisible and to insert this into the background plate, creating the impression of Halloway rushing down the street. But the character’s direction, and the basis of invisibility conceived by the visual and special effects are consistently limited, only allowing the character to move in a restricted direction. Moreover, the relocation and deploy of effects elements from one space to another is limited. Both Halloway’s passage from left to right and the creation of the scene through optical, mechanical and digital processes is exacting and precise, because the literal mechanics that enabled the shot preclude anything more radical.

Rodowick sees the passage of time as present even in so-called digital images, due to the succession of images continually refreshing upon, for example, a computer screen (137). Such images should not therefore be seen as images at all, since they are liberated from the inherent stillness of an image, including the photographic (138). Instead digital images should be seen as objects or elements, and it is this that begins to unleash the promise of invisibility, because these digital images, or objects, or elements,
produce VFX that are consistently able to move more freely. As noted previously, Lev Manovich saw digital media as subject to algorithmic manipulation, which allowed such media to become programmable. The basis of this theory shows that that digital imagery is highly mutable, changeable and therefore removable. It is never totally stable and, as Manovich goes on to describe, these new forms of media do indeed follow such theoretical dispositions in practice. In creating the various visual representations of invisibility within *Hollow Man*, the visual effects involved drew upon a number of elements (both physical and digital), creative practices, and ultimately digital computation that saw the film’s Invisible Man as a consistently moving, constructed entity.

Manovich notes that most data is seen as continuous: “the axis of or dimension that is measured has no apparent indivisible unit from which it is composed” (“Language” 28). The human body can be seen in a similar way – since a person appears to be made up of continuous surface, with a covering that has no obvious breaks and blends together. Yet the human body is constructed out of a wealth of discrete elements – from the internal organs, skeletal frame, and brain, through to the billions of cells that make up these pieces. Taking this one step further we can see pertinent avenues for discussion within recent adaptations of the Invisible Man. Manovich outlines the way in which data is converted through *digitisation*, via two steps: *sampling* and *quantisation*. “Sampling turns continuous data into discrete data, that is data occurring in distinct units: people, the pages of a book, pixels. Second, each sample is quantified, that is, it is assigned a numerical value drawn from a defined range (such as 0 – 255 in the case of an 8-bit greyscale image)” (Manovich “Language” 28). But, Manovich notes that certain old media such as film are a mixture of both continuous and discrete data. Film is one such example: “each frame is a continuous photograph, but time is broken down into a number of samples (frames)” (Ibid.).

The creation of the *Hollow Man*’s Invisible Man underlines how digital visual effects and film connect to create and visualise the character’s inherent transparency. The creative use of such technologies moves the character out of its cogent analogue placement and towards a more free-flowing cyberspatial situation. Visual effects supervisor Scott E. Anderson insisted that the use of a human performer was essential to
producing the titular character’s digital execution, which therefore led to Bacon being on-
set in order to interact with the mise en scène and other actors (E. Shay “Disappearing
Act” 112). At first this would seem to lock the character down, seemingly positioning
invisibility within the analogue real world, however this was only the first step in a
process that demonstrates the highly mutable and fluctuating conditioning of Caine’s
invisible character through VFX processes. Though Bacon’s physical performance is a
basis for the character, its development became a process of splitting this performance
and the acquired footage into a series of discrete elements. Such techniques draw the
character away from the practical and mechanical effects used to produce invisibility and
move it towards the sphere of cyberspace and cyberpunk, where the “meat” of the human
body ingests technology, creating a cyborgic self that exists on several different planes of
digital actuality.

Bacon was photographed from “every conceivable angle and put through a battery
of motion tests” (Ibid.), which were then used to retrofit the CGI model developed by the
effects personnel. The exterior scans were highly important in providing visual data for
the animators to work from, but were not the end of the process. The scans were then
used to work implosively - to visualise the internal organs, skeletal structure and
circulatory system that would be seen in scenes of Caine entering and returning from
invisibility and scenes of partial invisibility during the climax (Ibid.). Such work
highlights an initial illustration of how the body becomes stripped apart and launched into
new spheres of existence and locales that are removed from the real world. Bacon’s
physical being and movements are taken by Anderson and his associates and then used to
open out an internal, unseen world of the body, a body normally seen as wholly
connected and solid, and made discrete. Such separation is partially seen through the
scenes in which Caine begins to dematerialise – his skin breaking apart and the
underlying separate structures becoming partially seen, before becoming wholly
invisible. But beyond this the separation of the body parts references and acts as a
reference to cyberspace and the cyberpunk axiom. Because Bacon’s real self is taken
apart by the visual effects workforce, becomes retrofitted onto a digital self within a
digital realm and then discharged into the discrete film frames, the cinematic body
becomes a malleable digitised form. It is able to be moved, transferred from place to place, and in its final form operates in a digitised nature.

This methodology reflects the era of postmodernism, an era that, as noted previously, houses Bukatman’s Terminal Identity, where the human form is acutely connected with the technological. It is furthermore an era of fiction that poses “a set of crucial ontological questions regarding the status and power of the human” (Ibid.).

Quoting Baudrillard, Bukatman surmises, “the subject has become a ‘terminal of multiple networks’” (Ibid.) Such insights can also be seen in the creation of Caine in *Hollow Man*, since Bacon becomes such a terminal, an entity that is used as an input and output for technology of a digital manifestation. By using his body as a basis of information the digital visual effects, and the operators of these effects convene to split apart Bacon, making him invisible from the frame and creating a digital entity that “propels the subject into the machine” and “blurring the boundaries between human and machine [that] results in a superimposition that defies contemporary aesthetics” (Bukatman “Terminal Identity” 17 and 15). By completely pulling Bacon out of the frame and replacing him with a series of digital elements that are a combination of unseen computational algorithms and manipulated data from software and processors, the filmmakers blur such boundaries.

The previously mentioned use of Bacon as reference data, which is then absolved of existence and replaced by a sort of CGI “underskin” and other discrete elements, such as his skeleton and muscles, is one example. Further to this the CGI is also used to create the partially viewed form of Caine as he is caught in water, smoke and other gaseous elements, and other viscous liquids such as blood.

Bukatman later notes of Terminal Space, including representations of electronic space, that: “It invades ‘real’ space via flashy digitised graphics on TV, computer-generated geometries or processed images-within-images spinning across a field of the screen, voided of spatiotemporal context in a vertiginous display of their very depthlessness” (Bukatman “Terminal Identity” 107). Bukatman is referencing Baudrillard and his detailing of the lack of a verifiable “real” with which to identify in the modern world, where “the digital has replaced the tactile” (Ibid.). Whereas before, the photographic could be seen as a freezing and recording of time, digital technology highlights “temporal and spatial reductions” (“Terminal Identity”108) and computer
generated simulation “atomises and *abstractly schematises* the analogic quality of the photographic and cinematographic” (Sobchack qtd. in Bukatman “Terminal Identity” 108). The real is therefore invaded by the digital that, unlike even a frame of celluloid and the emulsion grains upon it, has no quantifiable depth. Such invasions hint at what the Invisible Man of Verhoeven’s film aspires to and arguably succeeds in doing. There is a sense of depthlessness to the special effects, both in creation, operation, and perhaps for some in value. The film’s various invisible moments play with the geometry of the physical body by obscuring its properties, such as weight, mass and shape, by showing us aspects through interaction with elements of liquid and gas. This interaction itself results in unsettling volumes and atoms of these elements, which are themselves a series of virtualised factors. We “see” Caine as he approaches Dr Kramer through his cigar smoke, dislocating the gentle lift of the smoke in the air, as well as the shimmering and toiling water as it becomes both moved and refracted through Caine’s transparent form. But the real diegetic elements of the film’s locations are split apart by the visual effects. Such techniques, which remove and replace, make invisible and visible, are here more menacing and invasive. In constructing the digital Invisible Man, the techniques of splitting down the performance from its temporal and spatial position calls upon a series of discrete elements, plus technologies, separated by spatial parameters no longer quantifiable through geometry. As Bukatman states “the digital processed graphics of electronic technology […] produce a constant mutation divorced from the metamorphoses of human time and experience (“Terminal Identity” 108).

This divorce from human time and experience begins to demonstrate how *Hollow Man*’s construction of an invisible entity moves beyond the analogue Invisible Man and those first instances of a digital Invisible character in *Memoirs*. More variable than Méliès attempts to remove and replace the human figure, within films such as *Le

53 Bacon originally appeared in the shots, dressed in green (for smoke shots) and black (for water shots) as reference for William Devane’s performance, to enable the CG artists to gauge Bacon’s position in the shots and to then digitally remove him. A series of clean plates without either actor were shot to composite with digitally animated versions of an invisible Caine, dispersing digitally created smoke and water, in order to depict his transparent body. These CG elements replicated real water and smoke, including bubbles and turbulent wakes that invade, blur and propel the human subject and other natural objects into the machine.
Mélomane/The Melomaniac (1903), digital invisibilisation in Hollow Man manages to more sinuously and fundamentally pull apart, conceal and replace the physical form. Within Hollow Man it is possible to see an initiation of more mutable and transformable processes that also introduce conceptions of cyberspace into the Invisible Man’s realisation. The pulling apart and releasing of Bacon’s body into the digital ether and the subsequent replacement of his physical form with digital additions is a statement of invisibility and a conceptualisation of cyberspace.

Unleashing Digital Invisibility.

Thus far I have sought to establish that the technological aesthetics of Hollow Man reflect a sense of cyberspace and digital technology’s capacity to be mutable, free flowing and centred upon a realm that is considerably divested of fleshy physical meat. I will now explore scenes of the Invisible Man’s dematerialisation and materialisation, and specific instances where he appears in a state of physical flux. Such exploration will better accentuate how these instances illustrate how this iteration of the Invisible Man and the creative use of visual effects achieve such value.

In discussing new media, Manovich states: “A new media object is not something fixed once and for all, but something that can exist in different, potentially infinite versions. This is another consequence of the numerical coding of media […] and the modular structure of a media object” (“Language” 36). This account could equally be applied to the Invisible Man, since as a character he has moved through a number of different renderings within literature and cinema, leading us to the most recent within Hollow Man. Audiences have seen a variety of characterisations, which have included Universal’s original adaptation of Wells’ novel, through sequels that had little connection to Griffin’s mad scientist. This chapter has already discussed The Invisible Woman and Carpenter’s Memoirs of an Invisible Man, a film that mixed comedy and romance with a chase narrative. Such films demonstrate the shifts and movement that the character and
idiom of invisibility has followed in connection to its manifestation by physical beings. Modularity is another important constant within new media, Manovich notes “These elements are assembled into larger-scale objects but continue to maintain their separate identities” (“Language” 30). This stresses the importance of the singular kernel at the heart of the film – the Invisible Man – which can be built into a greater framework, but in addition modularity can also allow the further attribute of variability. Consequently though Invisibility is a constant and central element, a digitised and variable version goes one stage further, allowing the form to more greatly flex and change. Manovich goes on to note: “Instead of identical copies, a new media object typically gives rise to many different versions. And rather than being created completely by a human author, these versions are often in part automatically assembled by a computer” (“Language” 36). Manovich also notes variability needs modularity to work; to be digital rather than in a fixed medium, since the elements must be discrete and autonomously assembled under “programmed control” – “created and customised on the fly” (Ibid. 36 emphasis mine).

Accordingly, it is possible to see the principles of digitisation being formed prior to their actual execution from the 1990s onwards. Theoretically this conceit is accomplished within the words of the novel, since words always retain individual sense, but are subject to revision by the reader, and hence become programmable, whilst the text is similarly programmed by the author prior to print – or indeed if the author revises the text after initial publication. Similarly Whale’s earlier “analogue” films and their sequels’ visuals, produced a sense of programmability – albeit again closed – with the insertion of the various optical layers and mechanical effects. These are subject to individual readings as both separate elements by scholars (such as in this thesis) and as a whole by audiences through Bazin’s theories of realism. But genuine implementation took longer to achieve.

The ability to “customise on the fly” is much more difficult to achieve in analogue filmmaking. Though actively customising can only be achieved to a certain degree – since present cinema is ultimately a closed medium, it has to have an end point when it is finalised in order for its distribution and exhibition – the capacity to customise the special effects of the Invisible Man in Verhoeven’s film was still potentially greater. As noted, the visual effects designers already retrofitted Maya software programmes to drive their effects work, but it is also worth noting that though months of pre-production saw them design and programme the visualisation of the character’s look, the efforts continued throughout and after principle photography. As Anderson states:

We didn’t know what the performance would end up being, we had to be sure our model was capable of duplicating as wide a range of Kevin’s movements as possible. We could not restrict our digital character. We couldn’t say: ‘Well no, our digital character can’t raise his shoulder that way.’ We had to prepare for anything the human body could do. We were going into this with the full understanding that once we allowed Kevin to do these things, we were opening up Pandora’s box – and we would then be responsible for putting everything back in. (E. Shay “Disappearing Act” 112)

This opening and closing of a Pandora’s box, from which evils, ills and diseases issued forth upon mankind and henceforth remained, acts as a metaphor of chaos, anarchy and disorder which had to be overcome or at least contained and restrained by the visual effects personnel. Anderson’s inference is no doubt of a technical nature, yet his account goes further. The methods used in creating the film’s visual effects see their configuration across a wide range of people and more importantly computer workstations, different software programmes, as well as the employment of Bacon. All such portions see a constant flow of information being sent from place to place, shifted unseen through different portals and a breaking apart of both physical performance and digitised information.

Though self-contained within a visual effects pathway of production, this flow of information is arguably a radical departure from the methods used in creating previous
visualisations of the Invisible Man. No longer limited to the photographing of actors dressed in appropriate black garb against similar stages and the development and optical adjustment of pieces of film in carefully followed stages. Instead we have the design process – involving discussion between artists and directors, the visual effects designers and their superiors, the testing of software, plus tweaking and modification of what is necessary due to feasibility of creative minds, technology and budgets. This tweaking and modification often continues through production as the basic footage requiring the effects is received and aesthetic or technological impediments are discovered that require further modifications. Simultaneously, as the effects pipeline begins and continues to render, animate, and build up shots, certain layers are being worked and re-worked upon by a number of different people. Furthermore the director, the visual effects supervisors and the producers may choose to radically alter and refine the work if they are unhappy with its look or overall motion. As Manovich notes:

If live action footage was left intact in traditional filmmaking, now it functions as raw material for further compositing, animating and morphing. As a result, while retaining visual realism unique to the photographic process, film obtains the plasticity that was previously only possible in painting or animation. To use the suggestive title of a popular morphing software, *digital filmmakers work with ‘elastic reality’*. (‘What is Digital Cinema?’” emphasis mine)

Manovich notes this is a condition previously only possible in animation, an elasticity that allows images and elements to be manipulated at will. Such media allowed elements to be transferred and changed from point to point; to reorganise and reappropriate information as if it were a form of flexible reality. Chapter two dealt with a certain level of plasticity, observing the possibilities digital effects and compositing allow to alter, remove and replace physical elements from film frames to create a new reality that best served the contextual reality of the particular production. Such reanimation of reality is a practical constant that is seen in many modern films, but as a symbolic idea it is not confined to animation, or indeed to the new medium of CGI, but also exists within the realms of cyberspace. This is because the filmmaking techniques that produce Caine’s
Invisible character move beyond the solely analogical environments of optical printers, physical models and the marriage of celluloid film with other pieces of celluloid film. Instead *Hollow Man* uses digital media to fuse the physical with the digital and electronic. By removing Bacon’s body and replacing it with a digitally constructed corpus, the character moves into the digital world – at least for a time. Such an extrapolation of reanimation becomes fused within *Hollow Man*, with its utilisation not just fuelling change and replacement of physical reality, but also more radical adjustment. The CG adjustments in *Hollow Man* see the residue of this digital fusion resulting in an opened up entity that is adjustable and variable, invisible and spaceless.

Jon Ippolito discusses the notion of space within cyberspace, drawing on the descriptive prose used by William Gibson in *Neuromancer* to outline the dramatic and spatial drive of this electronic world. The author notes the importance of such prose over the actuality of what hacking cyberspace would be expressed as. Ippolito says “most readers would have put the novel back on the shelf as soon as they read, ‘Case set his FTP client to continuous redial of the http://206.312.123.23 IP address, causing a General Protection Fault in Tessier-Ashpool’s CPU that triggered a RAM core dump....’” (“Is cyberspace really a space?”). In actuality there is little actual definable space within the electronic arena, but that the need for stating “data as a navigable space” has become not just a literary necessity, but a cultural and commercial one as well. Ippolito goes on: “[W]hat may have begun as a literary device has quickly risen to the status of a cultural necessity in a decade when the rapid proliferation of telecommunications protocols become so complicated that no single user, much less reader, could understand them all” (Ibid.). Consequently, computer users, as well as book readers, need to understand more easily what it is they are “reading” in order to fully experience the medium. Ippolito is conscious that the prevalence of antecedent spatial ideas should be realigned in order that we understand the growing developments of the wired world. Ippolito states:

The task is rather to take hold of the metaphor of space, and to bend and twist and stretch it into new possibilities with a bravado comparable to those non-Euclidean geometers of the 19th century who countermanded common-held axioms about space to create entire new worlds. (Ibid.)
Ippolito’s theorisation of space being bent and twisted into new possibilities is shown cinematically within *Hollow Man*, with Caine’s invisible character visualised as both figuratively elastic, being able to move flexibly through different permutations of shape and appearance, and furthermore as an expression of digital information that is itself elastic.

The idea of Caine’s Invisible Man being able to move freely and unseen through the film’s world was discussed earlier in this chapter, highlighting his anarchic will to rape, murder and steal. But the sophistication of this as a metaphor for special effects is enhanced by Ippolito’s theory. Though it is true that for some parts of the film Caine is “invisible”, he is never entirely so. There is always some form of interaction with an object, or element (real or digital), that allows us to see the character’s invisibility. But the visual effects used are generally not “bolted down”, so to speak. Wires or mechanical props, though used, were often superseded by digital manipulations of pixels and data that twist spatial parameters, whilst still producing a visually perceivable space. Consequently the realm of cyberspace and of cyberpunk becomes interpolated and invested in the digital effects of *Hollow Man*’s main character. Though we see the interaction and partially see the invisible form, we see it as a liberated and disordered form, a patchwork of elements drawn from numerous spaces that are not quantifiable merely in geometric terms. *Hollow Man*’s main character inverts the parameters of cyberspace, but simultaneously continues them. In using digital CGI Verhoeven’s film brings the aspects of cyberspace, together with cyberpunk and its constituent factors and characters into a diegetic reality, but still working with many of the same parameters.

One of the best examples of this bending of space and elasticity of the films spatial reality is seen in the disappearance, partial reappearance, and fluctuating presence of Caine’s physical form. As we see Caine undergo the effects of the serum he administers to himself, his physical self – and that of Bacon’s performance – is rapidly replaced by a succession of digital elements that are emitted from numerous different spatial and temporal co-ordinates. We initially see Bacon as Caine inject the blue irradiated serum into his vein with no apparent result, but soon Caine says he is feeling changes to his body. He suddenly reacts to the serum in the next shot – arching his back
and thrashing around. Verhoeven makes sure to show us Bacon performing the physical action, with his naked form being revealed in a series of shots as he twists and turns. The majority of these are close-ups, with the final one of Bacon’s face lunging at the camera in anguish. Verhoeven then sneaks a cut into a new shot as Caine rapidly moves away from the camera, which enables the start of frames that incorporate digital effects. We see portions of Caine’s cheek melting away to show subcutaneous matter, with a further patch on his chest soon developing. These elements are the result of CGI patches representing the underlying structure being matchmoved to the plate photography of Bacon on set. CGI therefore exists outside of the live action realm, created at a spatial and temporal distance that will then be joined to the other element for incorporation at another different time. Such elements begin to show how the spatial boundaries of cyberspace that are actually unseen are here visualised as a reflection of cyberpunk forms and aesthetics; we see them twist the boundaries of space, through the digital representation of Caine’s body.

As the scene unfolds we then start to see what Manovich notes as “a new kind of realism, which can be described as ‘something which is intended to look exactly as if it could have happened, although it really could not’” (“What is Digital Cinema?”). But furthermore the scene is also a representation of a different world, a cyberspatial and cyberpunked world, redolent of a new subject that is literally and figuratively shedding its actual physical being. Deborah Lupton sees this as a feature within “cyberwriting”, wherein “the body is referred to as the ‘meat’, the dead flesh surrounds the active mind which constitutes the ‘authentic’ self” (100). She notes further that it is the dream of cyberculture (and arguably cyberpunk literature, cinema and perhaps the entire digital future) to “leave the ‘meat’ behind and to be distilled into a clean, pure uncontaminated relationship with computer technology” (Lupton Ibid.). Lupton’s theoretical future is redirected in Hollow Man, with the CGI effects that visualise Caine seeking to leave the meat of Bacon behind and move into a “clean” digitised relationship with computer

---

55 Matchmoving involves using software to track an object fitted with markers during live action photography and incorporating a new element into the frame that precisely matches the original element (see E. Shay “Disappearing Act” 118 - 119).

56 This also reflects aspects of Stephen Prince’s perceptual realism as discussed in chapter two.
technology. Caine continues to dissolve, with further skin seeming to peel away into nothing to reveal a circulatory system of veins and arteries, together with the first real perception of the hollow nothingness that will ultimately consume him. The camera tracks in from Sarah relating Caine’s vitals, almost as if being sucked into the same void towards which Caine’s own physical substance continues to shrink. Though still present to a certain degree, Bacon’s physical self is increasingly replaced by a CG anatomical substructure. We see Caine’s hair shrink to nothing and the tendons of his neck and other transparent voids appear in between. This physical dissolution points towards the hacker, a physical figure Lupton notes, that is seen in popular culture as being “soft, not hard, from too much physical inactivity and junk food” rather than hard (like a computer or its technology) (102). Lupton goes on, suggesting that the real-life hacker isn’t difficult to pick out in public, having problems verbally communicating and having physiques and complexions that are poor.

As Lupton goes on, she quotes a so-called “profile” by T. Sarno for Bill Gates, founder of Microsoft, who defines him as somewhat dirty and scruffy. Gates, he says lives off a diet of fast food, “grease” is used twice in relation to his glasses, and the journalist says he hasn’t shaved for “at least two days” (Sarno qtd. in Lupton 103). Similarly the realisation that, following the arrest of hacker Kevin Mitnick, the public found that despite his “cheeky messages of bravura” and his Invisible Man-like ability to evade authorities for two years, he was in fact all too physiologically human and very visible. Lupton goes on: "Photographs of Mitnick showed him to represent the archetypal ‘computer nerd’, complete with thick spectacles, pale skin, pudgy body, double chin. These physical characteristics contrasted with the abstract images of his disembodied online hacker persona” (103). Lupton here distils the inherent fact that physical form is in fact permeable, breakable - essentially easily deformed and fragile; also conceptually opposite to that of an invisible one, a visually seamless entity that, because it can’t be seen, is difficult to physically hurt or break. Moreover the digital configuration of a personality, like the invisible one, can be masked and made into something much more than the original physical one. Though Bacon as an actor is about as far removed from pudgy as one can get, his character still embodies the ineptitudes of a hacker. Uncivil, awkward and rude around women, he falls back on voyeurism and crudities – such as a
Superman-Wonder Woman-Invisible Man joke - and is continually rude to his female associates, even before changes in his psychology begin. As the scene heads towards its climactic reveal, Bacon is entirely replaced with the CGI model, built up of a series of layers of veins, arteries, bone structure and muscles that flex and move in unison, but are still in actuality the production of a series of disparate spaces and times from various computer files and work-stations. Caine becomes the ultimate unsightly – indeed unsighted – hacker, able to move at will and no longer predictably held captive as he was previously in the appreciable sight of his own soft body. Though still within a body, being invisible allows Caine to detach from visual perception and move much more freely.

Such visuals arguably radicalise the perceivable space, using the effects to show us an entity that is detaching from the real world and entering that of a digitised cyberspace. It is also a statement of a body being set free, and the unnerving sight of the layers of muscles and structures normally unseen and invisible being made spectacularly visible further recalls the ambivalent nature of the hacker. Bruce Sterling notes:

There is no tradition of silence or OMERTA [a colloquial term meaning “code of silence”] in the hacker underworld. Hackers can be shy, even reclusive, but when they do talk, hackers tend to brag, boast and strut. Almost everything hackers do is INVISIBLE; if they don't brag, boast, and strut about it, then NOBODY WILL EVER KNOW. If you don't have something to brag, boast, and strut about, then nobody in the underground will recognise you and favour you with vital cooperation and respect. (“The Hacker Crackdown”, author’s original emphasis)

Caine’s invisibility within the film performs on a similar level. Ostensibly we would not and do not actually see him performing his voyeurism, snooping on conversations and undertaking most of his actions. But Verhoeven and company move to exploit and manipulate digital effects in dramatic ways in order to illustrate (and brag about) the action. As previously noted characters’ deaths aren’t merely sonically illustrated off screen, or broadly sketched in by an actor reacting to being strangled as in earlier productions. Instead we see Caine’s form connecting with those he attacks and violently
molests, and vociferously so. Though sometimes only partially seen – the use of vapour and water offers sightings of the outline of his body – the explicit sight of this incomplete body and the often bloody after-effects of his actions are still spectacularly visualised. Such sequences were also handed out to a secondary unit for production at Phil Tippett’s studio, highlighting a further dis-positioning of the effects pipeline and its workflow. This also involved further splitting up at Tippett’s studio into an assembly line in order to achieve the work before the film’s deadline (see E. Shay “Disappearing Act” 124).

Described as being manifested “abstractly” (E. Shay “Disappearing Act” 124), Tippett’s work involved working on those scenes in which Caine comes into contact with the aforementioned elements – water, blood, vaporous gases and fire – which were then visualised in ways that exuberantly played with the elements through digital means. Like Caine’s invisible body, the other elements with which he connects are stretched and augmented beyond their normal physical parameters because they existed only as digital constructs. Though appearing as real, they are digitally augmented elements that become plasticised, which Lev Manovich notes as integral to the use of live action photography within digital cinema. A sense of realism remains – Caine’s shimmering invisible body looks human even though it is essentially an animated element. Manovich says of modern live-action that it can now work akin to animation: “The result [equals] a new kind of realism, which can be described as ‘something which is intended to look exactly as if it could have happened, although it really could not.’” (“What is Digital Cinema”).

Especially complex and elasticised was the scene in which Caine murders Sarah. The panicked vetinarian hurls blood at Caine, drenching most of his torso with the fluid before desperately fighting him off. To achieve the shots Bacon acted alongside Dickens’s Sarah, wearing a green suit in order to be extracted with some replacement of the body in CGI. But the complexity of the scene saw the effects artists using a full CGI model in order to more gracefully create the blood-drenched character’s movements and expressions. But, interestingly the shot made use of subtle combinations of the CGI model alongside Bacon’s physical performance. As Frank Petzold of Tippett Studio notes “We did computer graphics hair, with the real face of Kevin Bacon; we did Kevin’s real hands with blood on them, then took over with a CGI hand. The shoulder is practical on one hand and fake on the other” (qtd. in E. Shay “Disappearing Act”). As Caine leaves
and wipes his hands of the blood the visual effects continued to move between real and digital hands, blending and dissolving in order to carry the shot through to its end (Ibid.). Such shots demonstrate the continued radical use of digital extensions of the body in the film. The movement between a real performer’s body parts and those of a digital construct, anarchically break down the fabrics of the diegetic space, announce the presence of the cyberpunk “hacker” (in the form of the visual effects), and the burgeoning want to remove flesh and corporeality and move into the digital realm.

A further significant example of this radicalisation comes in the film’s climax as Caine tries to exit the complex. Linda suddenly attacks Caine, now wearing a latex mask and clothing as a means of escaping into the real world, with a makeshift flame-thrower, which immediately burns both Caine’s clothing and skin with dramatic effect. The scene begins with practical effects – a stuntman wearing protective clothing under the costume being set on fire and the use of a rod puppet operated on set for close-ups of the flaming head. The practical effects continue into the next set of shots as Caine thrashes about trying to douse the inferno surrounding him by retreating and ripping the clothes from his frame. His burnt flesh is readily evident below as make-up applied to the performer.

Simultaneously, visual effects work also shows the walls and space beyond through the transparent voids of Cane’s torso and the eyeholes of his mask. This involved a combination of Bacon wearing charred flesh appliances as well as a blue suit, which allowed the digital removal of portions of the torso that had already flaked away and returned to invisibility. As he continues to rush away we see Caine’s remaining clothes and charred upper dermis flaking away to briefly show a visible lower dermis and a combination of transparent and underlying body parts. However, though the scene was set up as a practical effect and used a stuntman wearing prosthetics, and Bacon wearing the suit to remove body parts from the shot, the majority of the scene’s latter segments relied upon digital “puppets” and animation.

57 Initially handled by Amalgamated Dynamics, Inc. (ADI), the scene’s prosthetics and human performer were supplemented with CGI fire, then entirely removed and replaced by the Tippett Studios digital model. As Craig Hayes notes “it turned out to be a lot easier for us to just ditch the real guy, put our CGI guy in and match the performance. So, from the point where he tears the burning clothing off, that’s entirely fake – fake Sebastian, fake flames, fake smoke, and embers” (qtd. in E. Shay “Disappearing Act” 128).
The ensuing shots, showing Caine’s flaking, essentially decaying form illustrates his Invisible Man literally divesting himself of the fleshy meat of his skin – as a hacker ultimately aims for - spectacularly (if ironically) making it known to the world. Further scenes continue this theme, including Linda using the fire sprinkler system in order to discern Caine as he stalks her through the complex. Having painted out Bacon from the scene, a CGI model was again positioned within the now blank plate, a model that was made up of ten different layers at certain points. Estelle Shay notes that the shot incorporated digital effects that digitised the appearance of “rippling, streaming water, whilst the backgrounds visible through the character were treated with various distortion maps during the compositing process” (Ibid.). Once again this illustrates the de-fleshed digitised form, which in the multiple layers used to create its totality highlights how the digital supplements extend the body within the film’s cyberspatial realm. This shows us how digital effects make invisible and then visible portions of the film frame in order to create the necessary reality of the film, whilst drawing upon a series of digital elements drawn from various temporal and spatial locations. The scene – pushing the character and the film towards its climax – typifies the possibilities of digital invisibility. In creating and visualising the character within Hollow Man we see a series of disjointed, partially invisible but still connected elements. Moreover the elements, manipulated, digitised and extended are resplendent in an ability to move and be moved within, across and beyond the film’s diegetic realm.

This formation is further enhanced during the climax when Caine is electrocuted and his invisible form fluctuates in and out of invisibility. Described by Shay as “a highly interactive scene, more than any other” (E. Shay “Disappearing Act” 130), the series of shots replaced Bacon’s performance exactly with a digital double that was skinless, but featured what lay beneath – veins, arteries and muscles – as well as transparent spaces though his torso. However, it was necessary to repaint Caine as a digital construct very carefully. If too much of the frame was deleted from the frame the effects artists would have to digitally rebuild Linda as well, an interesting concept that would further push the ideas of invisibility. Not only would the film invisibilise the central character but others too, leading to questions of who is truly invisible and who is not. Consequently, certain portions had to be painted out, extending, but also contracting, the partly invisible body.
through digital extensions. All of which points to the problematic concept of space on show, but ultimately highlights the filmmaker’s attempts to visually deliver it to audiences.

As previously noted by Jon Ippolito, in cyberspace space can be construed as a region or construct that can be bent and stretched. The author continues, noting that cyberspace is not an idealised form that can merely be pre-set to specific boundaries of one type. He states,

By all means, let’s avail ourselves of [William] Gibson’s marvellous metaphor if it helps us understand the complex network of interconnected communications we find ourselves caught up in. Cyberspace can be bordered and distant or expansive and equidistant. It can also be curved or straight, have an inherent direction or be directionless, be two- or three- or more-dimensional, look the same or different to different users. (Ippolito “Is cyberspace really a space?”)

Indeed he notes that the idea of space as a conceptual means of drawing together points over distance is a more amenable and proficient manner of visualising the realm of cyberspace. Rather than looking at distance within such space as a broad and great volume, Ippolito here suggests that we squeeze the dimensions, reappropriating our understanding of distance as not necessarily huge and extensive but also conversely as short, minute and quickly achievable. Whilst understanding the notion of distance as notionally expansive, he stresses that information, such as emails, can be received from neighbouring landmarks as quickly as from across the Ocean (Ippolito “Is cyberspace really a space?”).

The idea of a decentralised space at the heart of cyberspace is arguably also at the heart of the Hollow Man’s central character, and indeed at the heart of the digital effects that construct him. It is also an analogy for much of what digital effects aspire to and attain. Michael Allen has noted that the onset of CG effects in Hollywood during the early 1990s has seen a sea change in what visual effects can achieve, but not without adjustments. As with Memoirs, when first practiced much of the CG effects and digital work suffered from technological limits. Allen says that CG effects were beset with a
visual fragility, and were placed in shots for a limited time, or intercut with other practical effects or live action to hide this fragility (825). The continual surge forward in sophistication saw digital effects move to be more consolidated, using longer shots that could astound (Allen 826). But in shortening and intercutting other elements space was already reappropriated, condensed, changed and disallowed to exist as it seemingly had. Hollow Man arguably reflects this latter idea, but it is concurrently possible to see the antecedent style at work. Within Hollow Man the visual effects actually still retain a certain advantage of this fragility in order to bend and reconceptualise space, akin to cyberspace. Though fragile, in that the various artists and workstations used to create them break them apart, CGI works to be both distinct and discrete (as a series of independent elements), but ultimately conjoined within the series of cinematic frames of the final film.

Allen continues to analyse the significant changes in how CGI effects recondition space, illustrating ways in which film aesthetics can operate in such contexts, and highlighting the changes in framing, cutting, camera movement and other stylistic and formal precedents. One of the most fascinating aspects of his exploration comes in his discussion of live and virtual worlds, wherein he notes that a structure of reality and artifice is set up: “[I]t is rare that several CGI shots are run together in sequence at any one time … The moment of ‘artificiality’, therefore, is both set up as coming out of, perhaps extending, the real and is also retrospectively reconfirmed by the real” (830). Though now somewhat outdated as a hypothesis (many films such as Revenge of the Sith and especially Avatar use multiple CG shots to build their narrative length), the use of non-CG “effects” is still a necessity in films such as Hollow Man58. Allen’s theory in essence is that films bracket the artificial in order to confirm the reality of the sequence. An example would be the use of a model, or puppet (something physically present within the scene) that indexically helps to root the digital construct. So, the use of an

58 An aspect which Allen himself notes:

This relationship between real and photographed, and simulated and computer-generated images, in which the former carefully frames the latter in order to boost its chances of establishing and maintaining weight of authenticity, will inevitably change as CGI systems and techniques become ever more sophisticated. (830)
animatronic T-Rex in the jeep attack scene in *Jurassic Park*, is carefully juxtaposed with the digital T-Rex through framing, cutting and camera movement, and allows a spectator to be more drawn into the scene’s credibility. Though it uses multiple linked CG visuals, a similar impression is seen in *Hollow Man*, where we have Bacon’s on-set performance mixed with various digital models, which interact with various elements and materials, as well as a partially erased Bacon who himself still interacts with the profilmic environment. Allen surmises: “the shift into the ‘virtual world’ and back out to the real repairs any momentary viewer scepticism about the believability of the former” (831). All of *Hollow Man*’s various interactive scenes can be seen as an extension of Allen’s observations. The careful use of Bacon’s on-set human performance as reference re-purposes Bacon’s performance as an “effect” for the Invisible Man and as physical liaison to his fellow cast members. This produces confirmation for both the digital artists’ application of the visual effects and the ultimate perception by audiences. But they also point towards an undercutting of the bracketing technique.

Though the digital Invisible Man is housed within the real of the photographic realm and CGI scenes can now be placed together, the extension of CGI still disintegrates the bracketing, and while spectators might seek some confirmation that what they are seeing is real, the ultimate realisation is that it is unreal. Though as noted in previous chapters invisible effects are proficiently used in many films to create a world that appears realistic, the work in many others – and *Hollow Man* in particular – is of a world patently fantastic and spectacular. Though the film generally features a realistic world in which the characters work and live, and they take time to provide a certain scientific reason and explanation for the experiments, the film’s actual representation and use of invisibility is beyond notions of pure realism. When we see a partially formed and vaporous Caine hunting down Linda, or witness his internal body parts fluctuating and shimmering in and out of view when he attacks her in the climactic lift shaft battle, we are clearly seeing a form that is extended beyond the oscillating purity of a binary live versus virtual. Caine as a character, like CGI itself, exists beyond nominal boundaries of live and virtual – he is both a human character and (via VFX) simultaneously a virtual one. With Caine (and indeed many of the other digital effects discussed in this thesis) we are always within a virtual world – it is a world that cinema always inhabits – and
consequently we are set free to travel back and forth within such a world and to become (vicariously at least) spatially detached, alongside the similarly detached and fleshless Caine.

In Kristen Whissel’s discussion of digital effects she emphasises an increasing upward mobility and new verticality within cinema. Whissel notes the use of the screen’s vertical axis in certain recent productions built upon “breathtaking falls and astonishing ascents” throughout cinema’s history seen in Fred C. Newmeyer and Sam Taylor’s Safety Last! (1923) and The Towering Inferno (John Guillerman and Irwin Allen 1974) (835). Whissel says a watershed was reached in 1996 with the release of Twister and Independence Day. Whissel’s argument hinges upon the suggestion that vertical axis is used “to frame possible outcomes in terms of [a] devastating fall and/or a wilfully insurgent rise” (836). She argues that “verticality mobilises various connotative meanings and feelings attached to ascent and descent” (Whissel Ibid.), with upward mobility tagged to a hero’s rise over apparently insurmountable odds in suitably epic surroundings such as Superman’s fight to raise the polluting mass of Kryptonite-infused land from the sea in Superman Returns (Bryan Singer 2006). Downwards verticality conversely reflects the “rapid approach of an inevitable end”, such as the vertiginous plummet and inevitable descent of the upended hull of James Cameron’s Titanic (1997). Whissel notes that digital technology “helped to liberate many aspects of production from the laws of physics, allowing for much more pronounced and sustained exploitation of the screen’s vertical axis” (839), allowing greater heights and depths to be explored and overcome or succumb to. But, though exploring the vertical and horizontal axes, Whissel fails to explore different axes, such as the horizontal and moreover depth, and how layers of CGI effects are used to build up almost all such shots – be they vertical, horizontal or otherwise. Whilst recognising that Titanic’s hull, the city of Minas Tirith in The Lord of the Rings film series, and other characters and locations illustrate soaring highs and lows, she doesn’t recognise the layers of effects that build and bend spatial parameters both within and beyond the film’s frame. To effect a three-dimensional space such as these in a two-dimensional frame requires considerable dexterity from effects artists, using shading, modelling programmes and a series of details that are discrete, separate and brought into play from other areas. These are then built into a reality that is an elasticised
one, akin to cyberspace and, like cyberpunk, developed and established as disordered structures.

Furthermore, this digital spatial depth has to bend and break out of the frame in order to attain such dimensionality. As described herein, to create Caine as a digital Invisible Man requires an excessive level of displacement of various digital elements and a stripping down and removal of the human body. The character is ultimately both removed and replaced by a level of digitally manipulated elements and forms, that flow in and out of the frame, radically playing upon spatial ideas. Whissel’s new verticality becomes transposed to house new implosive spatial quantities in order that we “see” into, and beyond Caine’s invisible body in its various forms. This transposes aspects of Whissel’s verticality theory, where the idea of seeing in depth – into objects and people – also produces connotative meanings. One such key idea is the aforementioned notion that we are able to see inside Caine, and the breakdown of the layers within his body to a void, allows us to conjecture that he is losing his place in the world. He can no longer see his body, unless a fabricated “skin” covers it, and this fabrication of body and physical ideas of the self is no match for his actual body. Though he ultimately revels in this new invisible self, it is a revelry that is couched in a loss of his sane and rational psychology. Whereas upwards and downwards verticality allowed us to chart aspects of accomplishment and dilemmas, often in stark terms, noting the representation of the internal depth of objects (Caine’s body), aspects (such as the movement of CG water, other liquids such as blood and smoke), and most importantly through the layers of CGI used to build the objects, provides a more complex and intense readings of the visuals. As a result the visual effects create a stronger characterisation by building up the layers of the object in question. Even when certain aspects are necessarily invisibilised, as in *Hollow Man*’s case, the effects artists are building in new layers such as smoke and water, in order to show us both the visualisation of the character and aspects of his internal characteristics. Furthermore, the creation of Caine’s invisibility, and those aspects surrounding and displaced by him, are produced through a series of separate elements that exist outside of the frame as well as originally within. Though Kevin Bacon provides the original photographic object, and reference for the digital elements, his body is erased and the various composited elements come form a range of software.
programmes, vendors, and other extraneous elements outside of the original photographic frame. Verticality becomes a more fully rounded “Dimensionality”, which incorporates multiple aspects of direction and spatial movement.

In conjoining various digital elements and using them in partial visibility and partial invisibility the digital effects used in *Hollow Man* therefore allegorise cyberspace and reflect the principles of cyberpunk. As Bukatman notes “Cyberspace is the new ground inscribed by the implosive forces of blip culture” (“Terminal Identity” 119), blip culture being Alvin Toffler’s rhetorical construct within which citizens become blips, or “electronic pulses which exist only as transitory bits or bytes of information in a culture inundated with information” (Bukatman “Terminal Identity” 27). Bukatman states that, in *Neuromancer*, Case “has been neurologically modified to experience the electronic field of space, a cosmos open to his exploration. The space arrayed before him has dimensions of depth, shape and substance” (“Terminal Identity” 120). As Bukatman notes of Case, so is it feasible that we see the digital manifestation of Caine’s Invisible Man in a similar light, with his form – a series of electronic blips of information - given depth, shape and substance, able to move and exist, and to have substance even though it does not.

**The Cyberspatial Positive’s and Negative’s.**

In producing the Invisible Man in Verhoeven’s film the digital elements are set on a path that is both defined and yet amorphous, given a type of substantial body and volume, and within the film’s diegetic world to similarly move and exist. Bukatman says:

> Cyberspace, in its vectored perfection, its spaceless space, its scaleless scale and its timeless time, seems like an electronic facsimile […] but in Gibson’s text this area is transformed into a *narrative* space and one therefore explicitly defined as a site of action and circulation rather than a null space. (“Terminal Identity” 121)

Certainly Verhoeven’s film seems to follows Gibson’s lead, taking on board the notion of invigorating the spaceless space with story, and instigating some kind of scale and space within its midst. Bukatman takes his cue from the works of sculptor Robert Smithson,
whose writing about other sculptors’ works saw a representation of “negative monumentalism. Such art forms, Bukatman notes, made up of inflexible, smooth man-made materials, such as metal, reflective chrome and plexiglass, provided a sense of immovability to the objects that stalled space, time and mimesis of the real world.

Bukatman continues: “[T]here is an absence of movement which implies a denial of space and time [and instead these forms] enact the demise of the past and future in favour of a timeless, spaceless and finally inertial present” (“Terminal Identity”120) It is akin to cyberspace, which Bukatman denotes as “a method of conceiving the inconceivable” (“Terminal Identity” 152). Furthering this, Caine’s invisibility in Hollow Man follows suit, where his character is shown as a series of visualisations that play upon characterising or narrativising the space and scale of the frames that contain him.

Sometimes we see through Caine, with only objects that connect to him being seen, such as the electrodes on his head. At other points we see the displacement of liquids and vapour that occlude and fracture aspects of his body, flowing over and off his figure, as seen during the fight within a swimming pool, and as he leaves the water. At these points, and many others, the invisible form has some sense of discernible surface quality. We can partially see Caine’s face and body during the moments involving water and smoke, and a notion – if slight - of his presence when attached to the electrodes. But at these points the visual effects used involve the replacement of areas featuring the actor with an insertion of a clean plate where his physique is situated for full invisibility, or the compositing of CG elements to create smoke and liquid. Beyond instilling some sense of shape in each shot, the visual effects more strongly abstract the shape, surface, scale and temporal occupation of Caine’s character within the film. Though we see something of the character, the respective reflective sheen and grainy haze seen issuing off of the water and smoke effects refract, congest and hinder how we perceive the character. This causes both a rearticulation of how we conceive the spatial and temporal presence of the character, and to read (and therefore create a narrative or character based sense) of the shots. The manifestations, using programmes that create particulate matter, noise and reflections, arguably cause viewers to consider the character as breaking down conceptions of space etc., as well as creating a sense of narrative and character. In creating the Invisible Man the CGI also produces the inconceivable, a character and feat
that is currently really impossible. As we know, the film’s invisible character is indeed fantastic. But Bukatman seems to address this by noting that cyberpunk literature, such as *Neuromancer*, might best be understood not as narrative per se, but more like poetry, “so that the images may perform their estranging, disembodying functions” (Ibid.).

Bukatman’s words seem entirely apt, since *Hollow Man* has arguably succeeded, as far as is currently possible, in producing an Invisible Man that lives up to its potential as an estranged and disembodied character able to move at will wherever it pleases. Caine is an invisible character that uses invisibility to move at will through a cinematic world without as many impediments and obstacles as previous versions of the character. The digitised visualisations of Caine’s form as unseen, partially seen and discerned in a state of flux, free of the physical traces of much that restrained him in previous films. As a figure of cyberspace and cyberpunk – digitally enhanced and ported through computers and software programmes – Caine’s Invisible Man is now more fully able to act upon impulses that allow him to be a voyeur, thief, and criminal. More importantly, his hollow characteristics are ably developed and enhanced by the digital effects used to drive him. The cyberspace hacker’s inherent nature – their capacity to move within a realm unseen, hacking through portals and gateways otherwise blocked, is a fundamental trait to the Invisible Man. And to move at will from point to point and to commit acts also encapsulated by the hackers – and more often Internet users - of the real world. Taking on board Andrew Butler’s words noted earlier in this chapter, Cyberpunk, with its virtual environments is able to free characters from the constraints their original physical bodies forced them to follow. In using computer-generated visual effects to generate the character, the film finally dispenses with much of the analogue weight that grounded him to the world and figuratively and literally shifts him into new realms and arrangements. In achieving this manipulation and reappropriation of the body – both in real, but more importantly digital terms - gives new bearing to the Invisible Man.

Though Caine’s character still retains the necessity of Bacon as a starting point – in order to model the invisible form – the use of software to strip and often entirely replace this basis highlights how invisibility has both replaced and reinvigorated the form. Though Bacon’s body is ‘present’ in scenes of invisibility – to provide reference for other actors and as reference for visual effects – the form is removed, replaced and
reinstated with a series of digital constructs that are highly mutable and adaptable. The use of such visual effects not only breaks down and drastically changes the physical constituents of the character, but of filmmaking itself, underlining the importance this so-called new media has upon not just the Invisible Man, but also in the make-up of modern cinema.
Conclusion: “I See You”

“It’s hard to fault ‘Avatar’ as an immersive visual experience. Pandora and its luridly coloured inhabitants are beautifully designed, though none of this ever feels remotely real” - Tom Huddleston (“Avatar Movie review”).

The preceding chapters have encapsulated a considerable journey, traversing a number of different cinematic areas, eras and aspects. In each, the prospect of Invisibility has hovered nearby, and I have argued there is an attempt to remove certain physical aspects of cinema and the fundamental make-up of its contents in visual and technical senses through VFX. Indeed, this has been a prospect undertaken since the earliest moments of cinematic production. In America, W. K. L. Dickson and Thomas Edison’s earlier iteration of motion pictures, the Kinetoscope, using a peephole-style system was bulky, and only one person at a time could observe the films (see Fig. 6.1) (D.A. Cook 7). This was in contrast to the soon-to-be-established systems of the Lumières in France, R W Paul in Britain and indeed Edison’s own re-worked version of the Kinetoscope, which enabled films to be projected onto a screen. In conceiving of a large-scale projection system that threw the image over people’s heads, the inventors began to invisibilise the physical systems of cinematic exhibition. Though spectators were nonetheless as interested in the technology as the films, the content soon outweighed the novelty.

Other physical constituents, and their concealment, were also significant from cinema’s origins. Situated within fairs, vaudeville, and between stage productions,
numerous other human acts and concrete attractions were close by, forging an intrinsic early link between bodies and film (D.A. Cook 29; Musser 184). Using mock-up carriages as an integral part of Hale’s tours performances, certain early cinematic exhibitions showed the form to be in close proximity to other physical objects and people (Gunning “Unseen”). In what Richard Maltby notes as the first “nickel-Odeons”, which were merely converted stores, the locations may well have reflected the buildings’ original commercial use (at least from the outside) (118). Rather than the specifically created “dream palaces”, these earlier nickelodeons were almost domestic spaces, similar to those people used to entertain and be entertained. Cathy Johnson writes, “Movie theatres quickly became the living rooms of the working class” (“Before”). However, these domestic physical constituents quickly changed and it wasn’t long until cinema progressed to purpose-built theatres, which began to demonstrate the tacit interplay between the visible and invisible. Opulent facades and interiors tempted a more aspirational and wealthy clientele, seating spectators in harmonious darkness that concealed the public from each other. Furthermore, this darkness creates a space into which being invisible could aid the lower tiers of the public into dreaming of better things.

This interplay between the absent and present continues within cinematic productions themselves, and has been discussed here. In outlining a range of films, the preceding pages have highlighted that conceptions of invisibility have become heavily entangled with the profilmic physical components of films themselves. The use of compositing and attendant VFX has managed to warp the profilmic, attack the definitions of the cinematic frame, bend and collapse concrete aspects of time, and reconfigure the physical motion of characters. Time and again the compositing of analogue and (in particular) digital elements has forced a recalculation of what audiences are really seeing, and what has been removed.

This thesis has shown the convergence of a number of pertinent issues that highlight the importance of invisibility as an explicit creative and meaningful impulse and force within cinema. Despite its place at the beginnings of filmmaking Georges Méliès’s work begins to highlight how invisibility constructs film form, as well as style, and that it breaks down the apparent physics of the make-up of celluloid film. Though
analogic in its construction and structure all of the hallmarks of what would follow – both in later cinema, VFX (both analogue and digital), digital formats, and indeed the arguments and case studies herein – can be found in the likes of *Le voyage dans la lune*, and *Le Voyage de Gulliver à Lilliput et chez les Géants*. That Méliès’s manages to create a film that can swallow up aspects of physical space, and reconvene those spatial parameters, along with the temporal features, is an important step that was taken forward in ever more discrete and advanced formats. Arguably this thesis has shown forms of invisibility, from the cinematicised black art onwards, become highly important as a driving force in narratives, spectacle, and as key formal and stylistic building blocks in film productions. Using VFX and optical compositing to combine the effects together allows films to produce the body of exorbitant numbers of films. These range from creating parts of worlds, such as the spectacular parting of the Red Sea in Cecil B DeMille’s *The Ten Commandments*\(^59\), to more implicit uses that include the use of VFX to keep an android’s eyes, played by actor Haley Joe Osment, from blinking and appearing human in *A.I. Artificial Intelligence* (Steven Spielberg 2001) (see Gizbert “Invisible”).

This thesis has interrogated the ways in which realism and surrounding theories within film productions are bound up in aspects of physicality, corporeality and truthfulness, are in a state of constant flux. Pulled apart and put back together through not just editing, but also compositing, the imagery of films such as *Citizen Kane*, and more recent productions like *Changeling* manage to take profilmic performances and settings – both in real locations and fabricated upon stages – and use the concepts of invisibility to pull apart the profilmic and make new, sometimes (but not always) different realities that create a cinematic whole. Where the concrete and unencumbered capture of images upon celluloid sees a mask applied that remakes and remoulds in order to coerce viewers into belief that what they are seeing has a strong semblance of reality, when it should not. This might range from the super-heroics of a Spider-Man zipping across New York, a

\(^{59}\) Here, VFX personnel used reversed footage of a water tank being flooded to show the sea’s parting, and two shots of the water tanks shot at ninety-degree angles to create the surging walls of water. This was then combined with shots of the cast on soundstages, featuring a foreground shot of Moses and his fleeing people, a mid-ground shot of the Pharaoh and his men in the basin of the sea, and a background of the stormy sky.
Super-Man flying through Metropolis, or even something as conventional, as the positioning of actors into a “real-world” setting convened from anything but. As in the creation of *Gone with the Wind’s* Tara homestead and other buildings and settings, including the journey of its heroine through a morass of wounded soldiers, concealed portions of the original shots, and the masked sections were made visible once more via the inclusion of glass matte shots. Those actual physical portions of the setting were partially invisibilised, and new areas made visible via the inclusion of new less “real” elements to create an apparently physicalized and truthful shot of Atlanta (Figure 6.2).

What the thesis has shown is that this enables a sense of connection with the imagery that enables an affect, as well as an effect, to be produced. The cinematic intangible has a dialogue with the tangible, and the audience, producing a haptic connection with the whole body and can be seen throughout the films discussed herein, from the likes of the original *King Kong* with its stop-motion effects, through optically composited settings, to the CG imagery of the fantastic, spectacular and not so spectacular of modern filmmaking.

Moreover the various VFX and compositing practices showcased here, highlight the importance of exploring aspects of realism should be continually pushed so as to highlight the malleability of cinema. Though important, and in may ways still current and identifiable, Bazin’s notion of capture (especially) and truthfulness can still be seen in
many films, and indeed in many using VFX. But simultaneously that capture and
truthfulness is in thrall to the attributes that cinematic photography allows. Can it be said
that Bazin and associated theories are wrong? Certainly they can be questioned, as has
been shown here. Indeed the mechanical nature of filmmaking that allows a constant
objectivity to be in place is also associated with both the human filmmakers, and more
importantly, with the abilities of the mechanics of VFX to take away (invisibilise), add
and augment the original source and the frames that hold them. Yet, the foresight of
Bazin was that he wished to interrogate realism, to investigate it so as to highlight the
differences between the highly modulated work of filmmakers such as De Sica and in
Japanese director’s Kenji Mizoguchi’s *Utamaro o meguru gonin no onna/Utamaro and
His Five Women* (1946) with temporally longer shots, and the Soviet montage of Sergei
Eisenstein and Dziga Vertov. Within these pages the theoretical dialogue engaged upon,
with reference to Bazin, and other scholars such as Laura Mulvey, Stephen Prince,
Rodowick and others, in relation to VFX shows that the nature of realism is there to be
examined, and to be put to task in order to draw forth new developments, uses and
reasonings.

So, the examination of VFX in films maintains this idea, moving arguments and
theorisations in new directions and channelling study into avenues so far only hesitantly
examined. Palpable uses of invisibility issue from VFX and compositing in the ranges of
films discussed, and continue to do so in more recent ones too. The avatar version of Jake
Sully (Sam Worthington) and the other Na’vi in *Avatar* is one such example. The avatar,
whose face looks quite similar to Jake’s, sees Jake’s brain direct the avatar’s physical
body, with the attendant physical and mental responses and feelings relayed back and
forth between Na’vi and human. This is highly illustrative and reflective of the VFX
processes used to create them. All of the central Na’vi performances were generated to a
greater degree by mocap technology that would then drive the CG character, including
recording the body movement, facial features and eyes. This ultimately allowed a very
dextrous connection for the creators between the actors’ performances and the CG
character, much as Sully and others controlled their avatars. A similarly deft approach
can also be seen in films such as the fully animated feature *The Adventures of Tintin: The
Secret of the Unicorn (Steven Spielberg 2011), as well as within David Fincher’s ostensibly live action The Curious Case of Benjamin Button (2008).

Mocap is used here (Figure 6.3) to invisibilise the visual aspects of the original human performance, and foregrounds how ontological uncertainty is developed, since it sees characters brought fully to fruition out of a combination of electronic data and profilmic performance, effectively re-animating partially erased original performances. As Julian Sancton writes:

the aging and youthing of Brad Pitt in The Curious Case of Benjamin Button, at the expert hands of Digital Domain, are so perfect as to be virtually invisible, free of the usual trappings of CGI—that too-fluid, superimposed look that makes the cattle stampede in Australia [(Baz Luhrmann 2008)], for instance, feel so unthreatening. Paradoxically, this may mean that the most impressive visual effects feat of the year may go unrecognized. (“Are Benjamin Button’s”)

People may not realise what they are watching, and as Sancton points out the “invisible effects” used poses questions as to what is “real” and present in the original (in this case digital) shot, what isn’t real, and indeed how it is produced, and that they may indeed be missed by audiences. These matters have here been grasped upon, but with a view to conferring not just how, but why. The notion of “deathlife” is again presented, along with a level of wonder, as well as fear, where audiences again get caught in a cyclical sense of intellectual rationality and irrationality. Such “performances” become an uncertain
mixture of physical and non-physical, yet audiences are interested and absorbed in it. *Button*’s central character’s creation, through the ageing, re-amalgamating of various bodies with, and de-aging, of Brad Pitt through the compositing of VFX shows that the creation of a film’s reality and the character’s within this reality is one that is full of questionable and highly interesting perspectives. As with the other films discussed here the theoretical bases applied represent both new perceptions on how audiences and scholars engage with and debate aspects, such as ontology, reality, and the implementation of VFX as a tool in manifesting the apparently (cinematically at least) real. Arguably they are often missed, because of their invisibility, and because of their basis as tools and/or “mere” spectacle.

Not only are the characters discussed herein “virtual” entities that recontextualise performance, but so too is much of their surrounding world. Therefore, whilst it is often a simulated character or environment, they confer a sense of concrete weight for audiences to connect with. Furthermore it can also be said that the prominence of the technology featuring in a wide variety of films, and the discussions carried out in these pages, creates a greater ubiquity that therefore allows for greater understanding. The experience produced becomes prevalent enough that it marks a change in how audiences and scholars perceive the capacity of mocap, virtual worlds, and other VFX as important and relevant. As has been shown the invisibilisation processes make something new, allowing it to begin to move beyond pure uncanniness in order to produce a distinct electronic presence.\(^6^0\).

This fusion, of “live” electronic elements in conjunction with antecedent profilmic ones, permeates a considerable amount of these films’ length. Drawing upon the processes of compositing outlined particularly in chapter two, where the creation of new regimes of reality was discussed, they create worlds situated somewhere between Bazin’s theorisations of realism and images that, though referentially unreal, can also be seen as perceptually real, so long as they behave according to attributes of physics and consistent diegetic laws within the film, and the featured arguments and discussions

\(^6^0\) Other recent films that suffuse their content with virtual sets and characters in similar ways include Andrew Stanton’s *John Carter* (2012), *Hugo* (Martin Scorsese 2011), *Real Steel* (Shawn Levy 2011), *Rise of the Planet of the Apes* (Rupert Wyatt 2011), *TRON: Legacy* (Joseph Kosinski 2010).
highlight new directions and the importance VFX and surrounding technology has within them.

*Avatar* is another Hollywood production that continues to develop ways in which invisibility is used to remove basic sets and performers, then make present a world that plays with the ontological basis of cinema. The film replaces certain tenets of profilmic capture with digital sets and “actors”, but retains an ability to read the imagery in depth, in scenes that show us the Pandorian world. Indeed, watching Jake Sully in his avatar form highlights a want by the filmmakers to ingratiate the viewer into the film’s world, particularly as we follow him through the undergrowth in his first proper “outing” in a journey that mirrors our own as spectators. The filmmakers create a highly “realistic” and immersive world. It is perhaps an even more realistic interpretation, with characters’ interaction with very detailed looking plants and their movement through the area – disturbing dirt, fronds and leaves – producing a strong sense of being “on location” (see Figure 6.4).

The visual detail within this sequence therefore produces a strong sense of “being there” and that the film’s locations seem to exist, by showing imagery that strongly evokes weight, movement, physical interaction and other apparently naturally occurring components. It’s a factor audiences very much took on board, particularly with relation to the use of 3D, with avatar-forums.com member Wameyn observing:
I’d say the most amazing part(s) for me was how awesome some of the things looked in 3D, especially the HUD in the shuttle as it was headed to Pandora, and then also when we saw all the bio lume for the very first time after Jakes [sic] torch was put out...so beautiful! (“The World”)

Similarly ar0c6 replied to another members post about ash raining down after a battle between the human’s and the Na’vi by saying: “Yeah there were people in the audience in front of me trying to avoid the burning ash coming down, it was unreal” (“Favourite 3D”). Though highlighting the 3D effect first and foremost, these responses demonstrate that the insertion of the digital VFX elements brings these viewers, together with the digital stereoscopy, into the diegetic world to a greater extent. The presentation in Avatar of a digital world and its characters managed to produce: “moments […] that sucked you into the scene” (HufweMakto “Favourite 3D”). It’s important to note that though spectatorial responses such as this demonstrate the incorporeal VFX produce sensations of engagement, even on a haptic level, they must also be seen as subjective. Couched in the domain of effusive hyperbole of Cameron’s innovative demonstration of technology, such comments remind us of those who watched the Lumière brothers work, such as L’Arrivée d’un Train en Gare de la Ciotat mentioned in chapter two. Though audiences may well have gasped in shock and awe, articles such as “Lumière’s Arrival of the Train: Cinema's Founding Myth” by Martin Loiperdinger, have poured scorn on such sensations. However, despite a lack of reliability, the affect of these VFX in producing a sense of reality is clearly apparent in reviews such as Stella Papamichael who states: “[Y]ou'd have to travel very far to feel so fully immersed in another world” (“Avatar”).

These sensibilities evoke Bazin’s deconstruction of Stroheim’s films, where we look increasingly carefully at the captured world in order that we (ironically) experience it as bare and unadorned (See “Evolution” 24). For despite the layers of imagery gathered, the film nonetheless features a depth in its cinematography, but simultaneously it plays with this idea. As with other films noted here (Sky Captain, Hollow Man, Star Wars Episode III: Revenge of the Sith etc.), the depth is one created not just in the frame and through longer takes, but also through a depth of both the inserted layers of images composited into the finished film, and external to it (through its creation), which recalls
the recontextualising of Whissel’s “new verticality”. Again, rather than an increase of height to demonstrate the rise of a hero to overcome a fall, or the inevitable descent into dangerous ends we are implosively looking into the world and Sully’s character as they are seen and constructed through VFX. The digital effects, and their use of invisibility shows how VFX subvert and play with physical laws in order to create a film that deals with multiple axes of presentation.

The work of such VFX continually conjures the virtuality of filmmaking, producing what Rodowick (21) sees as a destabilisation of the apparent ontological anchoring Bazin saw photography producing, but which of course was already present in so many analogue productions. Furthermore we can note the breakdown of the binary between reality and its notional conflict with fantasy that Mulvey’s work has pointed out. Though a fantastic enterprise the creation of the worlds and characters in such films arguably shows a continued ambivalence to notions of reality that audiences continue to engage with on such levels. All of which shows an extension of remediation, where we see previous technological (and narratival) principles being used that are inscribed within previously seen media. From mocap redeveloping rotoscoping, the digital updates of the black art used to create visuals, and other means to organise diegetic world of significant spatial parameters built from considerably less, Avatar and the other films deliberated here are ideally placed as yet another example of invisibility playing with temporal and spatial issues as discussed in this thesis.

Which is to state that the work developed within these pages highlights a pervasive and continued development of invisibility within cinema. The various notions discussed are constantly at work, and fundamental to numerous films, both old and new, and yet to be made. As a technique and conception invisibility perpetuates VFX within cinema, and cinema perpetuates invisibility via VFX. As such, this thesis has argued at length that the engendered idea of a body, bodies, or profilmic physicality within the cinematic form can be made both absent/present and present/absent. In doing so VFX and compositing is shown as a fundamental building block of how films develop theories surrounding realism, time, space, the reanimation of dormant forms and how both analogue and digital techniques allow the body to function within cinema. Consequently
it is an important theory that this body of work highlights, contributing to a greater understanding, and recontextualisation of film theory and history.

Many of these types of films continue to be made, promising spectacle and a form of realism, sometimes combined, sometimes separate, and they are doing so using techniques which finesse things which have already been and will continue to be. By this I mean to recall that many of the recent films are produced from a template that already exists. While the creation of imagery is done through digital means which continue to strip away much of the physical profilmic structures, they are produced through techniques seen previously in antecedent analogic productions. Films such as Spider-Man and its sequels, as well as more obviously Sky Captain, and such mocap films as the fully animated Monster House and The Lord of the Rings trilogy, we are seeing a disorder and loss of sets, strict physical performance and a creation of invisibility that uses very little obvious structures to do so. Most of Avatar’s worlds and settings, as well as similar productions such as Tim Burton’s Alice in Wonderland (2010), reduce the necessary sets and locations to a scant volume compared to what had been used previously. Whilst an epic such as Cecil B. DeMille’s The Ten Commandments (both in 1923 and 1956) used enormous sets to create its Egyptian settings, films such as Avatar and Alice use blank stages of much, much less size, and no actual locations. But in this sense it returns us right back to the earliest stages of film and cinema, where Méliès’s work sent us to worlds and spaces, times and experiences that were often far beyond our own scope of our period of recognition. So, though cinematically speaking we might indeed finally “see” much of what was previously thought impossible, due to technological advancements, we have in fact been observing such matters for over a century. Although we are experiencing significant technical advances in VFX, and within cinema generally, concepts of invisibility that are so evident within recent digitally produced films can nonetheless be continually traced back to antecedent points within film history. Though we are witness to technically impressive feats of invisibility, the fundamental principles have been revealed as emanating from the past, such as Méliès’s work, and all still remain of vital importance today.
Filmography

Abbott and Costello Meet Frankenstein. Dir. Charles Barton. 1948. Film.
A.I. Artificial Intelligence. Dir. Steven Spielberg. 2001
Alice in Wonderland. Dir. Tim Burton. 2010. Film.
Amadeus. Dir. Milos Forman. 1984. DVD.
Bambi. Dir. David Hand. 1942. DVD.
Black Narcissus. Dir. Michael Powell/Emeric Pressburger. 1947. DVD.
Beast From 20, 000 Fathoms, The. Dir. Eugène Lourié. 1953. Film.
Beyond the Rocks. Dir. Sam Wood. 1922. Film.
Buck Rogers. Dirs. Ford Beebe and Saul A. Goodkind. 1939. 12 part serial film
Cars. Dir. John LAsseter. 2006. DVD.
Citizen Kane. Dir. Orson Welles. 1941. DVD.
La Conquête du pole/Conquest of the Pole. Dir. Georges Méliès. 1912. DVD.
Démolition d'un mur /Demolition of a Wall. Dir. Louis Lumière. 1896. DVD.
Dr. Zhivago. Dir. David Lean. 1965. Film.
Earthquake. Dir. Mark Robson. 1974. Film.
L'éclipse du soleil en pleine lune/The Eclipse: Courtship of the Sun and Moon. Dir. Georges Méliès. 1907. Film.
L'Escamotage d'une dame chez Robert Houdin/The Vanishing Lady. Dir. Georges Méliès. 1896. DVD.
The Execution of Mary Queen of Scots. Dir. Alfred Clark. 1895. Film.
Fantasmagorie. Dir. Emile Cohl. 1908. Film.
Farrebique ou Les quatre saisons. Dir. Georges Rouquier. Film.
Frankenstein. Dir. James Whale. 1931. DVD.
The Friendly Ghost. Dir. Izzy Sparber. 1945. Film.
The Frighteners. Dir. Peter Jackson. 1996. Film.
The Ghost and Mrs Muir. Dir. Joseph L. Mankiewicz. 1947. DVD.
Ghostbusters. Dir. Ivan Reitman. 1984. DVD.
Gojira. Dir. Ishiro Honda 1954. Film.
Gone With the Wind. Dir. Victor Fleming. 1939. DVD.
Here Comes Mr. Jordan. Dir. Alexander Hall. 1941. Film.

*Hollow Man*. Dir. Paul Verhoeven. 2000. DVD.

*Un Homme de têtes/The Four Troublesome Heads*. Dir. Georges Méliès. 1898. DVD


*The Incredible Shrinking Man* Dir. Jack Douglas. 1954. Film.


*The Invisible Agent*. Dir. Edwin L. Marin. 1942. DVD.

*The Invisible Man*. Dir. James Whale. 1933. DVD.

*The Invisible Man*. Dir. Alan J. Levi et al. 1975. TV.


*The Invisible Man Returns*. Dir Joe May. 1940. DVD.

*The Invisible Man’s Revenge*. Dir. Ford Beebe. 1944.


*Jardinier brûlant des herbes/Gardener Burning Weeds*. Dir. Georges Méliès. 1896. DVD.


*Jurassic Park*. Dir. Steven Spielberg. 1993. DVD.


*King Kong*. Dir. Peter Jackson. 2005. DVD.


*Little Nemo*. Dir. Winsor McCay. 1911. Film.


*The Lord of the Rings: The Two Towers*. Dir. Peter Jackson. 2002. DVD.

*The Lord of the Rings: The Return of the King*. Dir. Peter Jackson. 2003. DVD.

Le Mélomane/The Melomaniac. Dir. Georges Méliès. 1903. DVD.
Metropolis. Dir. Fritz Lang. 1927. Film.
Monster House. Dir. Gil Kenan. 2006. DVD.
The Most Dangerous Game. Dirs. Irving Pichel and Ernest B. Schoedsack. 1932. DVD.
Paisa. Dir. Roberto Rossellini. 1946. Film.
Une Partie de cartes/Playing Cards. Dir. Georges Méliès. 1896.
Pinocchio. Dir. Ben Sharpsteen, Hamilton Luske, Norman Ferguson, T. Hee, Wilfred Jackson, Jack Kinney and Bill Roberts. 1940. DVD.
Pirates of the Carribean: Dead Man’s Chest. Dir. Gore Verbinski. 2006. DVD.
Pirates of the Carribean: At World’s End. Dir. Gore Verbinski. 2007. DVD.
Rakvicáryna/Punch and Judy. Dir. Jan Svankmajer DVD.
Le Revenant/Mr. Jones’s Experience With a Ghost. Dir. Georges Méliès. 1903.
Rise of the Planet of the Apes. Dir. Rupert Wyatt. Film.
Robocop. Dir. Paul Verhoeven. 1987. DVD.
Saving Private Ryan. Dir. Steven Spielberg. 1998. DVD.
Shanghai Express. Dir. Josef Sternberg. 1932. Film.
Shrek. Dir. Andrew Adamson and Vicky Jenson. 2001. DVD.
Shrek the Third. Dir. Chris Miller and Raman Hui. 2007. DVD.
Snow White and the Seven Dwarfs. Dir. Walt Disney. 1939. DVD.
*La Sortie des usines Lumière/Leaving the Lumière Factory*. Dir. Louis Lumière. 1895.

  Web.

*Spider-Man*. Dir. Sam Raimi. 2002. DVD.

*Spider-Man 2*. Dir. Sam Raimi. 2004. DVD.


*Stachka/Strafe*. Dir. Sergei Eisenstein. 1925. Film.


*Star Wars Episode II: Attack of the Clones*. Dir. George Lucas. 2002. DVD.

*Star Wars Episode III: Revenge of the Sith*. Dir. George Lucas. 2005. DVD.

*Star Wars Episode IV: A New Hope*. Dir. George Lucas. 1977. DVD.


*Sweeney Todd: The Demon Barber of Fleet Street*. Dir. Tim Burton. 2007. DVD.

*The Ten Commandments*. Cecil B. DeMille. 1923. DVD.

*The Ten Commandments*. Cecil B. DeMille. 1956. DVD.


*The Thing From Another World*. Dir. Christian Nyby (Howard Hawks, uncredited). 1951. DVD.

*The Thing*. Dir. John Carpenter. 1982. DVD.

*Tomei Ningen/Transparent Man*. Dir. Motoyoshi Oda. 1954. Film.


*Total Recall*. Dir. Paul Verhoeven. 1990. DVD.

*Toy Story*. Dir. John Lasseter. 1995. DVD.


*Toy Story 3*. Dir. Lee Unkrich. 2010. Film.

*TRON*. Dir. John Lisberger. 1982. DVD.

*TRON: Legacy*. Dir. Joseph Kosinski. Film.

Utamaro o meguru gonin no onna/Utamaro and His Five Women. Dir. Kenji Mizoguchi’s. 1946. Film.


Le Voyage de Gullivers à lilliput et chez le les Géants/Gulliver’s Travels Among the Lilliputians. Dir. Georges Méliès. 1902. DVD.

Le Voyage dans la lune/A Trip to the Moon. Dir. Georges Méliès. 1902. DVD.


Bibliography


*American Cinematographer*. 1920 -. Print.


Desowitz, Bill. “*Revenge of the Sith*: Part 2- Digital Environments Strike Back.”


---. “*Spider-Man 3*: Creating a Bigger Arsenal at Sony Picture Imageworks.” *awn.com*.


Ebert, Roger. “Sky Captain and the World of Tomorrow.” Chicago Sun-Times 
Ezra, Elizabeth. Georges Méliès. The birth of the auteur. Manchester & New York; 
Fielding, Raymond. The Techniques of Special Effects Cinematography. London, New 
---. “Hale's Tours: Ultrarealism In the Pre-1910 Motion Picture.” Cinema Journal 10.1 
Google groups, 30 May 2002. Web. 29 February 2012.
Fulton, John P. “How We Made The Invisible Man.” The ASC Treasury of Visual Effects. 
Ed. George E. Turner. Hollywood, California: American Society of 
Gibbs, John. MISE-EN-SCÈNE. Film Style and Interpretation. London and New York: 
Gibson, William. Neuromancer. London, Glasgow, Toronto, Sydney, and Auckland: 
Gizbert, Richard. “‘Invisible Effects’ Sculpt Film Scenes.” Abcnews.go.com. abc NEWS, 

March 2012.


Discussion Thread - Page 2.” *homethetherforum.com.* Home Theater Forum Forum, 17 

Gunning, Tom. “An Unseen Energy Swallows Space: The Space in Early Film and Its 
Relation to the American Avant-Garde Film.” *Film Before Griffith.* Ed. John L. Fell. 

Print.

Cinema Space Frame Narrative.* Ed. Thomas Elsaesser. London: BFI Publishing, 


Haraway, Donna. "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in 
the Late Twentieth Century.” *Simians, Cyborgs and Women: The Reinvention of 

Hayward, Susan. *Cinema Studies: The Key Concepts.* 2nd Ed. London and New York: 

“Hein. Character File.” *Final Fantasy: The Spirits Within.* Dir. Hironobu Sakaguchi and 
Moto Sakakibara. 2001. DVD.


Maynes, Charles. “Re: Constantine scene.” Message to sound designer/sound editor. 2 September 2010. E-mail.


“Travelling matte shot.” *InTRAlinea. Department of Interdisciplinary Studies in
Translation, Languages and Culture of the University of Bologna, Italy. intralinea.it. inTRAlinea, 1998 – present: n. pag. Web. 4 August 2010.


Wall-E Production Notes. Walt Disney Pictures. 2008. PDF.


